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DIVISION OF THE
STATE GEOLOGICAL SURVEY
JOHN C. FRYE, *Chief*
URBANA

REPORT OF INVESTIGATIONS 177

ILLINOIS MINERAL INDUSTRY
IN 1953

BY


WALTER H. VOSKUIL



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URBANA, ILLINOIS

1955



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ILLINOIS MINERAL INDUSTRY IN 1953

BY

WALTER H. VOSKUIL

ABSTRACT

The annual report of mineral production in Illinois in 1953 is a summary, intended as a ready reference, of the output and value of Illinois mineral products and minerals processed but not mined in Illinois. The minerals include coal, petroleum, natural gas, stone, lime, cement, clay products, sand, gravel, silica sand, fluorspar, and metals. The economic analyses of the mineral industries are accompanied by maps, tables, and graphs.

INTRODUCTION

MAN HAS ALWAYS been dependent on nature's storehouse of useful substances for his well-being, means of protection, and hope for the future. As man advanced in discovery and knowledge throughout the ages he found more and more things which he could use to enhance his comfort and productivity. Today, through the advancement of science, the inventory of useful substances has continued to grow and includes resources which were not regarded as resources yesterday.

The recognition accorded a specific area by peoples of the world today is determined largely by two basic factors—its natural resources and the capabilities of its inhabitants. The state of Illinois is singularly fortunate in both respects. Illinois possesses wealth of agricultural, mineral, and human resources. Most of its prairie acreage is covered with fertile soils which yield rich crops. Beneath this highly productive surface lie mineral deposits of great value, and the calibre of its leaders and citizenry is of the highest order.

The geographic position of Illinois in the heart of the upper Mississippi Valley, bounded by navigable rivers and touching on the Great Lakes, together with its web of railroads and highways, gives it ready access to diverse raw materials and markets. Here the primary materials of industrial production—fuels and iron ore, the latter from the Lake Superior district—are assembled in abundance at low cost for processing near the large market of Chicago and smaller cities in the industrial belt.

The opportunities for production and employment in this inland empire are unsurpassed by most areas. Able leadership in government, industry, and science has, through proper exploitation and conservation of Illinois' mineral raw materials—coal, petroleum, fluorspar, sand and gravel, clay, zinc, and lead—brought to Illinois a position of eminence in the national picture.

ACKNOWLEDGMENTS

This report was compiled with the cooperation of the Bureau of Mines of the United States Department of the Interior, the Illinois State Department of Mines and Minerals, and mineral producers throughout Illinois, who furnished information regarding their operations.

Special acknowledgment is made to Ethel M. King, who assembled the statistics for the sections on stone, sand, gravel, clay and clay products, silica, and tripoli; and to W. L. Busch, who prepared the sections on coal, coke, petroleum, natural gas, zinc, lead, and fluorspar.

Each section of the report was prepared in close collaboration with the staff of the several mineral research divisions of the Illinois State Geological Survey. Special assistance and advice were contributed by several members of the Coal Division; A. H. Bell, Geologist and Head of the Oil and Gas Division; J. E. Lamar, Geologist and Head of the Industrial Minerals Division; F. H. Reed, Chief Chemist and Head of the Geochemistry Section, and G. C. Finger, Chemist and Head of the Fluorspar Division of that Section.

TABLE 1.—SUMMARY OF MINERAL PRODUCTION OF

| Line No. | Material | Detail table | Unit | 1951* ^c | |
|----------|--|--------------|------------|--------------------|---------------|
| | | | | Quantity | Value at |
| | | | | | Total |
| 1 | Coal—bituminous | 6-7 | Tons | 54,870,000 | \$223,320,000 |
| | <i>Petroleum</i> | | | | |
| 2 | Crude oil | 13 | Bbls. | 60,244,000 | 166,876,000 |
| 3 | Natural gas—marketed | — | M. cu. ft. | 11,425,000 | 1,748,000 |
| 4 | Natural gas—used in fields | — | M. cu. ft. | 11,780,000 | 1,333,000 |
| 5 | Natural gasoline | 15 | Bbls. | 2,900,000 | 6,786,000 |
| 6 | Liquefied petroleum gases | | | | |
| 7 | | | | — | 176,743,000 |
| | <i>Stone, rock products</i> | | | | |
| 8 | Limestone and dolomite | 23 | Tons | 19,005,400 | 23,082,600 |
| 9 | Cement | — | Bbls. | 8,648,647 | 20,775,900 |
| 10 | Lime | — | Tons | 462,690 | 5,878,300 |
| 11 | | | | — | 49,736,800 |
| | <i>Clay, clay products</i> | | | | |
| 12 | Clays | 26 | Tons | 283,806 | 1,334,400 |
| 13 | Clay products | 26 | — | — | 53,594,300 |
| 14 | | | | — | 54,928,700 |
| | <i>Sand and gravel</i> | | | | |
| 15 | Sand | 27 | Tons | 6,607,153 | 4,854,700 |
| 16 | Gravel | 27 | Tons | 8,521,200 | 6,398,500 |
| 17 | Special sands | 28 | Tons | 2,818,700 | 6,335,000 |
| 18 | | | | — | 17,588,200 |
| 19 | Ground silica, tripoli, ganister | — | — | — | 2,731,000 |
| 20 | Fluorspar | 31 | Tons | 204,328 | 9,294,700 |
| | <i>Metals</i> | | | | |
| 21 | Zinc | — | Tons | 21,776 | 7,926,500 |
| 22 | Lead | — | Tons | 3,160 | 1,093,364 |
| 23 | Silver | — | Fine oz. | 3,465 | 3,136 |
| 24 | | | | — | 9,023,000 |
| 25 | Annual mineral production | | | | 543,365,400 |
| | <i>Minerals processed, but mostly not mined, in Illinois</i> | | | | |
| 26 | Coke produced and by-products sold | 10 | — | — | 75,655,000 |
| 27 | Pig iron produced | — | Tons | 6,575,674 | 305,966,100 |
| 28 | Slab zinc | — | Tons | 108,544 | 39,510,000 |
| 29 | Miscellaneous minerals | — | — | — | 6,015,300 |
| 30 | Total minerals processed | | | — | 427,146,400 |
| 31 | Total minerals produced and processed | | | — | \$970,511,800 |

* Revised figures.

^a Compiled from various sources, as stated in footnotes in each table.^b Preliminary or estimated figures.^c Subject to revision.

INTRODUCTION

9

ILLINOIS, SOLD OR USED BY PRODUCERS, 1951-1953*

| | 1952* c | | | 1953 ^{b, c} | | | Line No. |
|---------|------------|-----------------|---------|----------------------|-----------------|---------|-------------|
| plants | Quantity | Value at plants | | Quantity | Value at plants | | |
| Av. | | Total | Av. | | Total | Av. | |
| \$ 4.07 | 45,752,600 | \$187,585,600 | \$ 4 10 | 45,966,100 | \$180,646,800 | \$ 3.93 | 1 |
| 2.77 | 60,071,000 | 166,397,000 | 2.77 | 59,025,000 | 171,586,000 | 2.91 | 2 |
| 0.153 | 10,183,000 | 1,650,000 | 0.162 | 9,500,000 | 1,567,500 | 0.165 | 3 |
| 0.113 | 12,081,000 | 1,447,000 | 0.12 | 11,500,000 | 1,437,500 | 0.125 | 4 |
| 2.34 | 2,790,000 | 7,015,000 | 2.51 | 3,800,000 | 9,500,000 | 2.50 | 5 6 |
| — | — | 176,509,000 | — | — | 184,091,000 | — | 7 |
| 1.20 | 22,606,000 | 28,835,300 | 1.27 | 22,000,000 | 27,300,000 | 1.24 | 8 |
| 2.40 | 9,042,260 | 21,663,400 | 2.40 | 9,500,000 | 23,750,000 | 2.50 | 9 |
| 12.70 | 460,775 | 5,917,000 | 12.84 | 485,000 | 6,305,000 | 13.00 | 10 |
| — | — | 56,415,700 | — | — | 57,355,000 | — | 11 |
| 4.61 | 227,685 | 1,159,700 | 5.10 | 234,145 | 1,284,100 | 5.48 | 12 |
| — | — | 43,351,400 | — | — | 46,160,400 | — | 13 |
| — | — | 44,511,100 | — | — | 47,444,500 | — | 14 |
| 0.74 | 6,822,660 | 4,924,600 | 0.72 | 6,882,850 | 5,108,500 | 0.74 | 15 |
| 0.75 | 8,758,635 | 6,253,800 | 0.71 | 8,108,750 | 6,166,200 | 0.76 | 16 |
| — | 2,597,690 | 5,912,500 | — | 2,477,800 | 5,886,700 | — | 17 |
| — | — | 17,090,900 | — | — | 17,161,400 | — | 18 |
| — | — | 2,763,100 | — | — | 2,816,500 | — | 19 |
| 45.49 | 188,293 | 9,481,200 | 50.35 | 181,000 | 9,050,000 | 50.00 | 20 |
| 364.00 | 18,816 | 6,246,900 | 332.00 | 14,563 | 3,174,730 | 218.00 | 21 |
| 346.00 | 4,262 | 1,372,400 | 322.00 | 3,322 | 883,650 | 266.00 | 22 |
| 0.905 | 3,781 | 3,400 | 0.905 | 2,454 | 2,220 | 0.905 | 23 |
| — | — | 7,622,700 | — | — | 4,060,600 | — | 24 |
| — | — | 501,979,300 | — | — | 502,625,800 | — | 25 |
| — | — | 69,308,000 | — | — | 72,668,000 | — | 26 |
| 46.53 | 5,484,209 | 264,942,100 | 48.31 | 6,200,000 | 297,600,000 | 48.00 | 27 |
| 364.00 | 108,500 | 36,022,000 | 332.00 | 110,000 | 23,980,000 | 218.00 | 28 |
| — | — | 1,491,800 | — | — | — | — | 29 |
| — | — | 371,763,900 | — | — | 394,248,000 | — | 30 |
| — | — | \$873,743,200 | — | — | \$896,873,800 | — | 31 |

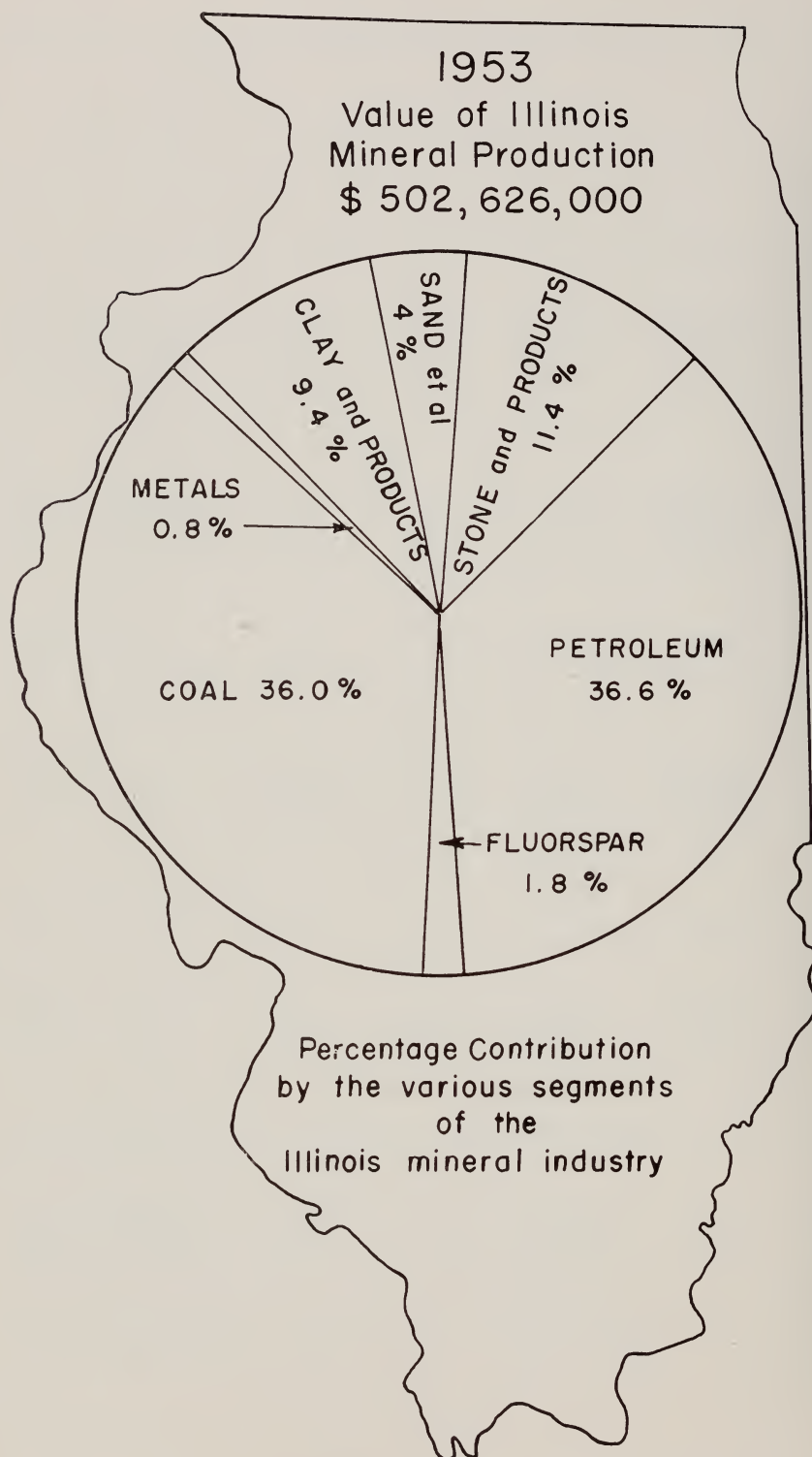


FIG. 1.—Value of Illinois mineral production for 1953.

1953 ECONOMIC REVIEW

The nation's economy in 1953 produced more goods and services and generally provided a higher standard of living than in any previous year. The gross national product, which measures the market value of the national output, was 367 billion dollars in 1953—about 5.5 percent higher than in 1952, as determined on an unadjusted basis. For the year as a whole, the rise in production from 1952 to 1953 was especially pronounced in manufacturing and the public utilities, but it was shared by most non-agricultural industries.

Prices were generally stable in both the consumer and wholesale markets during 1953 although some individual commodities and commodity groups experienced a rise or fall in price. The changes largely cancelled out in the over-all market.

Spending in 1953, both in the aggregate and on a per capita basis, was the highest on record. Personal consumption expenditures amounted to about 230 billion dollars as compared to 218 billion dollars in 1952. Total disposable income in 1953 amounted to approximately 248 billion dollars, and the rate of personal savings was about 7 percent of this amount. Outlays of business, government, and individuals were all higher in 1953; farmers were the only important group spending less than the year before.

Industrial production in 1953, as measured by the Federal Reserve index, was about 8 percent higher than in 1952, and most of the increase in output was available for the civilian economy. The basis for the expansion in 1953 was provided by the record volume of raw materials produced. By the end of the second quarter supplies had generally caught up with demand, as exemplified by the metals which had been in relatively short supply the preceding two years.

Construction activity in 1953 set a record in both dollar and volume terms; aggregate expenditures totaled about 35 billion dollars, 7 percent more than the value of work put in place in 1952. Privately built houses in 1953 totaled about 12 billion dollars,

7 percent more than in 1952 and close to the record activity of 1950. The trend toward home construction in outlying areas of cities continued in 1953; approximately 50 percent of the private housing units were outside of urban areas.

Agricultural production in 1953 was of large aggregate output—about equal to the record year of 1952. However, the value of commodities reaching the market or going under loan to the Commodity Credit Corporation rose to a new high because marketings were somewhat larger than actual production during the year.

Foreign transactions of the United States during 1953 were in many respects a continuation of the pattern which had developed in the latter part of 1952. Exports, excluding military-aid items, remained relatively stable after the decline of mid-1952. The decline in exports of fuel and steel which started then continued during 1953 as more abundant supplies of these commodities were developed abroad. During 1953 about 17 billion dollars worth of our output was marketed in foreign countries, as compared with 18 billion dollars in 1952.

MINERALS IN 1953

Mineral production in the United States during 1953 was the greatest in history, according to a summary prepared by the Bureau of Mines of the United States Department of the Interior. The Bureau of Mines has estimated that the total mineral production of 1953 was worth 14.3 billion dollars, up 7 percent from 1952. The greatest increase occurred in fuels, but metals and nonmetallic minerals also figured in the rise.

Substantially responsible for the gain from 1952 was the output of petroleum and natural gas, as well as a record production of iron ore. These factors counteracted the continued decline in coal output, which was down several percentage points from the 1952 production figure.

Based on preliminary figures, the production of crude oil set another record high in 1953 with an output of approximately

TABLE 2.—VALUE OF ILLINOIS MINERAL PRODUCTION, 1914-1953^a
(Thousands of dollars)

| Year | Mineral production | Minerals processed, but mostly not mined, in Illinois | Total minerals produced and processed |
|----------------|-----------------------|--|---|
| 1914 | \$117,166 | \$ 44,843 | \$162,009 |
| 15 | 114,446 | 82,871 | 197,317 |
| 1916 | 146,360 | 130,082 | 276,442 |
| 17 | 234,736 | 144,754 | 379,490 |
| 18 | 271,244 | 149,740 | 420,984 |
| 19 | 213,701 | 95,077 | 308,778 |
| 20 | 373,926 | 137,228 | 511,154 |
| 1921 | 254,019 | 54,136 | 308,155 |
| 22 | 244,618 | 85,820 | 330,438 |
| 23 | 282,761 | 142,131 | 424,892 |
| 24 | 235,796 | 95,506 | 331,302 |
| 25 | 231,658 | 118,702 | 350,360 |
| 1926 | 237,242 | 119,642 | 356,884 |
| 27 | 180,394 | 105,099 | 285,493 |
| 28 | 188,099 | 110,622 | 298,721 |
| 29 | 182,791 | 125,516 | 308,307 |
| 30 | 148,311 | 89,303 | 237,614 |
| 1931 | 108,066 | 52,014 | 160,080 |
| 32 | 71,693 | 24,385 | 96,078 |
| 33 | 74,837 | 34,786 | 109,623 |
| 34 | 89,212 | 41,405 | 130,617 |
| 35 | 96,484 | 57,038 | 153,522 |
| 1936 | 117,916 | 78,693 | 196,609 |
| 37 | 133,437 | 104,359 | 237,796 |
| 38 | 130,155 | 50,482 | 180,637 |
| 39 | 215,157 | 86,324 | 301,481 |
| 40 | 287,327 | 114,814 | 402,141 |
| 1941 | 333,225 | 168,338 | 501,563 |
| 42 | 341,835 | 199,281 | 541,116 |
| 43 | 337,912 | 221,939 | 559,851 |
| 44 | 342,832 | 206,833 | 549,666 |
| 45 | 344,267 | 193,658 | 537,925 |
| 1946 | 379,673 | 183,491 | 563,164 |
| 47 | 458,734 | 264,652 | 723,386 |
| 48 | 567,624 | 291,866 | 859,490 |
| 49 | 487,808 | 293,652 | 781,460 |
| 50 | 539,236 | 364,532 | 903,769 |
| 1951 | *543,366 | *427,146 | *970,512 |
| 52 | *501,979 | *371,764 | *873,743 |
| 53 | ^b 502,626 | ^b 394,248 | ^b 896,874 |

^a Revised figures.^a Compiled from following sources:

For years 1914-1922, incl.—U. S. Geological Survey, Mineral Resources of United States.

For years 1923-1931, " —U. S. Bureau of Mines, Mineral Resources of United States.

For years 1932-1938, " —U. S. Bureau of Mines, Minerals Yearbooks.

For years 1939-1953, " —Summary of canvass made by Illinois Geological Survey and U. S. Bureau of Mines, and from Minerals Yearbooks.

^b Preliminary figures.

2,360 million barrels, up 3 percent from 1952. The value of this oil was about 6,370 million dollars at the wells. Natural gasoline increased in output by about 5 percent, and liquefied petroleum gas production showed a 13 percent gain. Marketed production of natural gas was up 5 percent, with an average gain in value of about 8 percent per thousand cubic feet.

The production of iron ore reached a record high in 1953 despite a slight drop in demand during the latter part of the year. Shipments totaled about 119 million tons, up 20 percent from 1952. Copper production continued at about the same level

as in 1952; supplies of zinc and lead were well in excess of demand during 1953, which brought about curtailment of production.

The production of the fertilizer minerals in 1953 was the greatest in history despite a somewhat decreased consumption in the second half of the year. Marketable production of phosphate rock increased about 10 percent, and potash showed an 8 percent increase over 1952.

Although data on the production of sand, gravel, and stone are incomplete, it appears that output of these commodities increased in 1953.

COAL INDUSTRY

The wealth of the United States is directly related to its supply and utilization of fuels. Although this country is only a small part of the world, having about one-seventh of the land area and about 7 percent of the population, it is strong because of the work it does—about 40 percent of all that is done in the world. Accomplishing this amount of work with such a small proportion of the world's population means that the United States has put to use other sources of energy to a degree unequalled elsewhere. Productive capacity has increased in this country to such an extent that we use about five times more energy from fuels than we did in 1900.

The basic sources of energy in common use today are coal, petroleum, natural gas, wood, and water power. Coal is the most plentiful, most available, and most important single source, and furthermore, it can be produced with efficiency, economy, and abundance.

During the past dozen years impressive progress and development has taken place in the bituminous coal-mining industry. Today it is equipped to produce the tremendous amount of coal needed by the national economy from a firm core of sound companies that employ an array of efficient machines operated by highly trained and skilled men.

PRODUCTION IN 1953

The record of coal production in the United States during the four-year period 1950 to 1953 and of the average annual production from 1940 to 1949 is shown in table 3. Production in 1952—467 million tons—was down about 13 percent from the substantial 534 million tons mined in 1951. The average yearly output of coal for the decade ending in 1949 was 555 million tons. Preliminary figures for 1953 indicate a decline of about 3 percent from the 1952 total. Coal production for the United States in 1953 is estimated at 453 million tons.

PRODUCTION BY STATES

The states east of the Mississippi River

produced more than 90 percent of the nation's annual bituminous coal output, and of all the coal-producing states West Virginia is foremost with about 30 percent of the total coal produced in the United States. Other top coal-producing states are Pennsylvania, Kentucky, Illinois, and Ohio (table 3, fig. 3).

Although competition among these states is keen, there is a certain degree of market specialization, based mainly on the characteristics of their coal. The manufacture of metallurgical coke requires coal obtained primarily from a small area in the Appalachian coal province. Pennsylvania, West Virginia, and eastern Kentucky supply most of the coking coal for the coke ovens and iron works of Pennsylvania, Ohio, and the lake districts.

The upper Mississippi Valley coal market area includes Illinois, Indiana, Wisconsin, Minnesota, Iowa, Missouri, the eastern Dakotas, and Kansas. In this area is marketed coal from the Eastern Interior

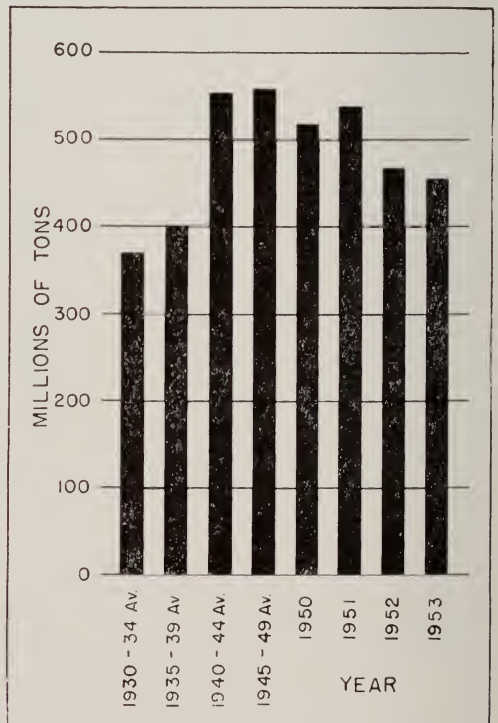


FIG. 2.—National production of bituminous coal, 1930–1953.

TABLE 3.—NATIONAL PRODUCTION OF BITUMINOUS COAL^a
(In thousands of tons)

| State | 1940-1949 av. annual production | 1950 | 1951 | 1952* | 1953 ^b | Percent of 1953 total |
|--------------------------------------|---------------------------------------|---------|---------|---------|-------------------|-----------------------------|
| Alabama | 17,120 | 14,422 | 13,597 | 11,383 | 12,120 | 2.68 |
| Alaska | 318 | 412 | 494 | 686 | 892 | .20 |
| Arkansas | 1,668 | 1,169 | 1,107 | 873 | 755 | .17 |
| Colorado | 6,828 | 4,259 | 4,103 | 3,623 | 3,600 | .79 |
| Illinois | 63,670 | 56,291 | 54,200 | 45,790 | 46,030 | 10.16 |
| Indiana | 23,250 | 19,957 | 19,451 | 16,350 | 15,660 | 3.46 |
| Iowa | 2,294 | 1,891 | 1,630 | 1,381 | 1,150 | .25 |
| Kansas | 3,166 | 2,125 | 1,961 | 2,029 | 1,500 | .33 |
| Kentucky | 66,470 | 78,495 | 74,972 | 66,114 | 63,735 | 14.07 |
| Maryland | 1,715 | 648 | 589 | 588 | 565 | .12 |
| Missouri | 3,847 | 2,963 | 3,269 | 2,955 | 2,310 | .51 |
| Montana | 3,666 | 2,520 | 2,345 | 2,070 | 1,865 | .42 |
| New Mexico | 1,420 | 727 | 783 | 760 | 580 | .13 |
| North Dakota | 2,570 | 3,261 | 3,224 | 2,984 | 2,770 | .61 |
| Ohio | 32,326 | 37,761 | 37,949 | 36,209 | 33,450 | 7.39 |
| Oklahoma | 2,731 | 2,679 | 2,223 | 2,193 | 2,145 | .47 |
| Pennsylvania | 130,732 | 105,870 | 108,164 | 89,181 | 94,260 | 20.81 |
| Tennessee | 6,446 | 5,070 | 5,401 | 5,265 | 5,660 | 1.25 |
| Utah | 6,003 | 6,670 | 6,136 | 6,140 | 6,500 | 1.43 |
| Virginia | 17,924 | 17,667 | 21,400 | 21,579 | 19,455 | 4.29 |
| Washington | 1,408 | 874 | 857 | 844 | 695 | .15 |
| West Virginia | 150,976 | 144,116 | 163,310 | 141,713 | 132,000 | 29.14 |
| Wyoming | 7,723 | 6,348 | 6,430 | 6,088 | 5,263 | 1.16 |
| Other states | 422 | 116 | 70 | 43 | 40 | .01 |
| Total | 554,693 | 516,311 | 533,665 | 466,841 | 453,000 | 100.00 |
| Percent change from previous year | | | +3.4 | -12.5 | -3.0 | |

* Revised figures.

^a Source: U. S. Bureau of Mines.^b Preliminary figures.TABLE 4.—PRODUCTION OF BITUMINOUS COAL IN THE EASTERN INTERIOR COAL FIELD^a
(In thousands of tons)

| Year | Illinois | | Indiana | | West Kentucky | | Total |
|--|----------|----------------------|---------|----------------------|---------------|----------------------|---------|
| | Amount | Percent ^b | Amount | Percent ^b | Amount | Percent ^b | |
| 1940-1949 av. annual production | 63,670 | 61.3 | 23,250 | 22.4 | 16,870 | 16.3 | 103,790 |
| 1950 | 56,291 | 56.1 | 19,957 | 19.9 | 24,033 | 24.0 | 100,281 |
| 1951 | 54,200 | 56.7 | 19,451 | 20.4 | 21,890 | 22.9 | 95,541 |
| 1952* | 45,790 | 55.0 | 16,350 | 19.6 | 21,182 | 25.4 | 83,322 |
| 1953 ^c | 46,030 | 56.0 | 15,660 | 19.1 | 20,470 | 24.9 | 82,160 |

* Revised figures.

^a Source: U. S. Bureau of Mines.^b Percent of total in Eastern Interior coal field.^c Preliminary figures.

coal field in Illinois, Indiana, and western Kentucky (table 4), and also from the Appalachian districts. Coal is distributed by rail, rail-lake, rail-river, and truck. Coal is required in the upper Mississippi Valley for domestic heating, for general industrial purposes, for railroads, and for the manufacture of metallurgical coke.

EASTERN INTERIOR BASIN

Production of bituminous coal from the Eastern Interior coal field for the four years 1950 to 1953 is shown in table 4. The production history of Illinois, Indiana, and western Kentucky and the contribution of each to the total production of the Eastern Interior Basin from 1913 through 1942 are shown in table 4 of *Illinois Mineral Industry in 1942* (Voskuil and Stevens, 1944). Data concerning coal-mining activity in the Eastern Interior coal field are given in the annual Illinois mineral industry reports since 1942.

ILLINOIS COAL PRODUCTION

The 46 million tons of coal produced in Illinois in 1953 represent a year of mining activity equal to 1952. During 1953 Illinois continued to contribute its share to the nation's coal pile by supplying a little over 10 percent of the total (Illinois' average contributions usually range between 10 and 11 percent).

In 1951 and 1952 strip mining, which has been growing in prominence for many years, increased in the Illinois coal fields.

In 1951 Illinois strip mines produced more coal than in any previous year—18.3 million tons, or 33 percent of the total Illinois coal produced that year. In both 1952 and 1953 over 36 percent of the coal produced in Illinois was from strip mines.

CUMULATIVE COAL PRODUCTION

Table 5 gives cumulative coal production for Illinois, by counties, for the period 1882 to 1953, as compiled from the annual Coal Reports of the Department of Mines and Minerals, and an estimate of production for the period 1833 to 1881. Also shown is the last year of known coal production for any county which has ceased production. Sixty-nine counties have recorded production and eleven of them have produced more than 100 million tons each (fig. 6). Franklin County has the highest recorded production with a total of over 463 million tons. Table 5 also shows the total number of years each county in Illinois has produced coal between 1882 and 1953. A history of coal production by counties and by years was published as table 14 in *Illinois Mineral Industry in 1947* (Voskuil, 1949).

COAL PRODUCTION IN ILLINOIS BY COUNTIES

During 1953 thirty-five counties in Illinois produced a total of almost 46 million tons of coal. Fourteen of the counties produced one million or more tons each and as a group accounted for over 90 percent of the total output of the State. Table 6 gives, in some detail, information concerning the type of coal mines in each county and the production from each group. Table 7, which is a summary of the 1952 Illinois coal production, indicates that the average value of Illinois coal was \$4.10 per ton, according to the United States Bureau of Mines. Therefore the final value of all coal produced in Illinois in 1952 amounted to more than 187.5 million dollars. The estimated value for the 1953 production is 180.6 million dollars, based on the United States Bureau of Mines preliminary average value of \$3.93 per ton for all Illinois coal.



FIG. 3.—The states which produced 90 percent of the nation's bituminous coal in 1953.



FIG. 4.—Illinois, Indiana, and western Kentucky coal fields and the main mining districts.

COAL MARKETS

Utilities.—One of the fastest-growing major industries in the United States is electric utilities. Generating capacity has increased from about 45 million kilowatts in 1942 to 82 million kilowatts in 1952, and according to recent estimates it will show steady increase during the next few years (table 8). Coal makes up the greater part of the fuel used in electric power plants today.

Steel.—Because more people use more steel every year, the steel industry has expanded not only to meet the demand from the increase in population, but also to meet the demand from the increase in per capita consumption. As the primary metal of our economy, steel will continue in unabated demand through increasing use in combination with other metals, plastics, concrete, and ceramics. The steel industry has increased its capacity from about 90 million tons in 1943 to 124 million tons in 1953. Continued growth of our economy and standard of living depends upon steel, which in turn depends upon coal.

Railroads.—In 1953 Class I railroads used about 28 million tons of coal, about half the amount used in 1951. During the first eleven months of 1953, 1990 new locomotives were delivered; of these, 1972 were diesel-electric, 14 were steam, and 4 were gas turbine-electric. Efforts to perfect an efficient coal-burning gas turbine-electric locomotive to compete with diesel-electrics are continuing, but progress has been slow.

Retail.—Although the market for retail deliveries of coal amounted to 61 million tons in 1953 it was some 7 million tons of coal less than in 1952. The gas industry claimed many new customers in 1953, and oil for household heating gave coal added competition. However, steps are being taken by the producing and retail segments of the coal industry to develop a satisfactory automatic coal-burning device in order to get new customers and to retain present customers for coal.

Exports.—The United States exported in 1953 a total of 33.7 million tons of coal, a decrease of about 30 percent from the 47.6 million tons exported in 1952. As a

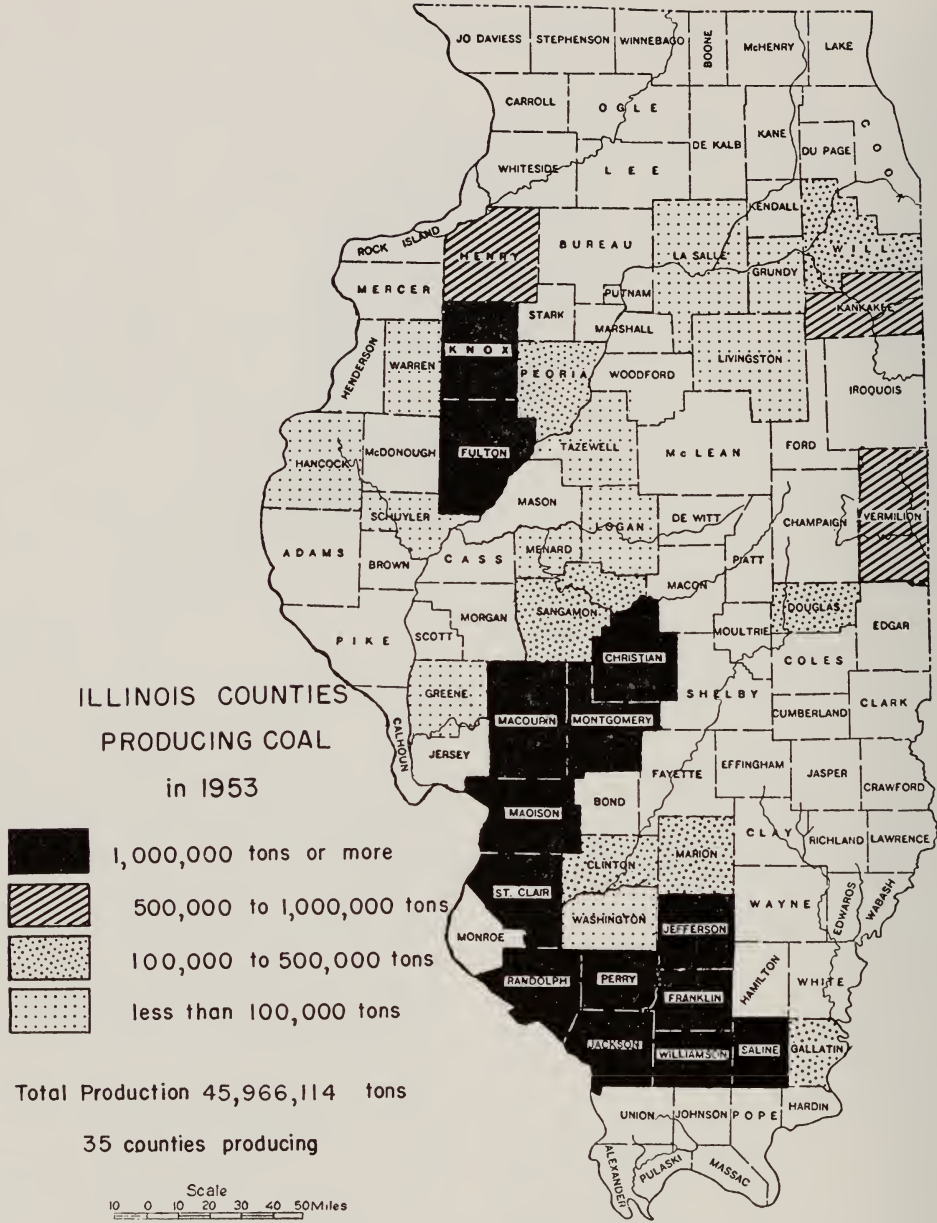


FIG. 5.—Illinois coal production by counties, 1953.

TABLE 5.—ILLINOIS COAL PRODUCTION BY COUNTIES, 1882-1953^a

| County | Total pro- duction (in tons) | Total years of pro- duction | Last year of pro- duction | County | Total pro- duction (in tons) | Total years of pro- duction | Last year of pro- duction |
|--------------------|---------------------------------------|--------------------------------------|------------------------------------|--|---------------------------------------|--------------------------------------|------------------------------------|
| Adams | 46,186 | 15 | 1942 | Mercer | 14,998,922 | 69 | 1952 |
| Bond | 7,355,569 | 57 | 1942 | Monroe | 8,284 | 13 | 1941 |
| Brown | 57,324 | 34 | 1950 | Montgomery | 81,334,270 | 72 | 1953 |
| Bureau | 48,274,097 | 69 | 1950 | Morgan | 190,787 | 64 | 1951 |
| Calhoun | 96,247 | 27 | 1912 | Moultrie | 2,032,236 | 16 | 1924 |
| Cass | 212,477 | 53 | 1941 | Peoria | 65,311,881 | 72 | 1953 |
| Christian | 205,358,170 | 69 | 1953 | Perry | 157,338,326 | 72 | 1953 |
| Clinton | 38,133,279 | 72 | 1953 | Pike | 5,081 | 8 | 1942 |
| Coles | 198,932 | 6 | 1888 | Pope | 1,562 | 11 | 1938 |
| Crawford | 44,786 | 13 | 1942 | Putnam | 10,071,893 | 29 | 1938 |
| Douglas | 896,648 | 8 | 1953 | Randolph | 66,092,860 | 72 | 1953 |
| Edgar | 915,698 | 41 | 1952 | Richland | 154 | 1 | 1890 |
| Effingham | 796 | 1 | 1890 | Rock Island | 3,846,169 | 67 | 1948 |
| Franklin | 463,110,979 | 55 | 1953 | St. Clair | 220,094,912 | 72 | 1953 |
| Fulton | 169,227,944 | 72 | 1953 | Saline | 185,530,255 | 72 | 1953 |
| Gallatin | 4,594,799 | 69 | 1953 | Sangamon | 232,361,457 | 72 | 1953 |
| Greene | 624,244 | 70 | 1953 | Schuyler | 2,930,951 | 71 | 1953 |
| Grundy | 40,177,222 | 72 | 1953 | Scott | 612,476 | 61 | 1942 |
| Hamilton | 22,097 | 16 | 1905 | Shelby | 4,119,763 | 67 | 1950 |
| Hancock | 616,167 | 67 | 1953 | Stark | 1,227,280 | 69 | 1952 |
| Hardin | 40 | 1 | 1890 | Tazewell | 17,619,195 | 72 | 1953 |
| Henry | 21,861,234 | 72 | 1953 | Vermilion | 149,135,472 | 72 | 1953 |
| Jackson | 80,921,729 | 72 | 1953 | Wabash | 186,144 | 29 | 1943 |
| Jasper | 23,739 | 11 | 1939 | Warren | 684,589 | 72 | 1953 |
| Jefferson | 10,082,907 | 50 | 1953 | Washington | 17,734,986 | 72 | 1953 |
| Jersey | 120,350 | 59 | 1951 | White | 1,676,741 | 36 | 1940 |
| Johnson | 242,109 | 51 | 1939 | Will | 36,545,025 | 72 | 1953 |
| Kankakee | 4,874,341 | 34 | 1953 | Williamson | 293,622,152 | 72 | 1953 |
| Knox | 25,592,807 | 72 | 1953 | Woodford | 7,810,160 | 70 | 1951 |
| La Salle | 65,502,820 | 72 | 1953 | | | | |
| Livingston | 10,095,463 | 72 | 1953 | Total (1882-1953) | 3,287,348,040 | | |
| Logan | 14,201,645 | 69 | 1953 | | | | |
| Macon | 11,000,468 | 65 | 1947 | Estimated production (1833-1881). . . . | 73,386,123 | | |
| Macoupin | 260,462,323 | 72 | 1953 | | | | |
| McDonough | 2,634,903 | 69 | 1951 | | | | |
| McLean | 5,544,139 | 47 | 1928 | Total production (1833-1953). . . . | 3,360,734,163 | | |
| Madison | 156,377,584 | 72 | 1953 | | | | |
| Marion | 38,879,931 | 72 | 1953 | | | | |
| Marshall | 12,516,141 | 70 | 1951 | | | | |
| Menard | 13,325,723 | 72 | 1953 | | | | |

^a Source: Illinois State Department of Mines and Minerals.

TABLE 6.—PRODUCTION AND VALUE OF COAL

| County | Total value ^b all coal | Shipping Mines | | | |
|----------------------|---|--------------------|---------------------------|---------------------|---------------------|
| | | Number of mines | Tons mined underground | Tons mined strip | Total tons mined |
| Christian | \$26,417,947 | 3 | 6,722,124 | — | 6,722,124 |
| Clinton | 509,764 | 2 | 129,711 | — | 129,711 |
| Douglas | 901,401 | 1 | 229,364 | — | 229,364 |
| Franklin | 18,034,342 | 7 | 4,588,891 | — | 4,588,891 |
| Fulton | 23,827,598 | 9 | 42,004 | 5,846,257 | 5,888,261 |
| Gallatin | 629,751 | — | — | — | — |
| Greene | 5,482 | — | — | — | — |
| Grundy | 121,233 | — | — | — | — |
| Hancock | 43,753 | — | — | — | — |
| Henry | 2,935,246 | 3 | 52,687 | 687,448 | 740,135 |
| Jackson | 4,280,898 | 3 | 459,741 | 608,043 | 1,067,784 |
| Jefferson | 5,380,535 | 1 | 1,369,093 | — | 1,369,093 |
| Kankakee | 3,304,843 | 1 | — | 840,927 | 840,927 |
| Knox | 4,424,080 | 3 | 11,545 | 1,083,500 | 1,095,045 |
| La Salle | 50,316 | — | — | — | — |
| Livingston | 15,952 | — | — | — | — |
| Logan | 132,480 | — | — | — | — |
| Macoupin | 4,103,278 | 6 | 1,044,091 | — | 1,044,091 |
| Madison | 4,056,067 | 3 | 1,016,468 | — | 1,016,468 |
| Marion | 597,655 | 1 | 152,075 | — | 152,075 |
| Menard | 54,863 | — | — | — | — |
| Montgomery | 6,414,589 | 1 | 1,632,211 | — | 1,632,211 |
| Peoria | 1,460,632 | — | — | — | — |
| Perry | 15,705,066 | 9 | 1,938,907 | 2,056,637 | 3,995,544 |
| Randolph | 5,418,043 | 5 | 566,823 | 806,481 | 1,373,304 |
| St. Clair | 13,784,616 | 7 | 1,857,638 | 927,114 | 2,784,752 |
| Saline | 11,696,517 | 8 | 2,411,237 | 446,401 | 2,857,638 |
| Sangamon | 559,255 | — | — | — | — |
| Schuyler | 108,232 | — | — | — | — |
| Tazewell | 43,831 | — | — | — | — |
| Vermilion | 3,339,533 | 2 | 39,027 | 746,832 | 785,859 |
| Warren | 3,847 | — | — | — | — |
| Washington | 83,320 | 1 | 11,983 | — | 11,983 |
| Will | 534,806 | 1 | — | 136,083 | 136,083 |
| Williamson | 21,667,057 | 20 | 4,075,967 | 1,310,011 | 5,385,978 |
| Total | \$180,646,828 | 97 | 28,351,587 | 15,495,734 | 43,847,321 |

^a Source: Illinois State Department of Mines and Minerals.^b Based on U. S. Bureau of Mines average value of \$5.93 per ton for Illinois.^c Coal mined in Bureau County.

FROM ILLINOIS MINES BY COUNTIES*, 1953^a

| Local mines | | | | County totals | | |
|-----------------|------------------------|------------------|------------------|-----------------|------------------|------------------------|
| Number of mines | Tons mined underground | Tons mined strip | Total tons mined | Number of mines | Total tons mined | Percent of state total |
| — | — | — | — | 3 | 6,722,124 | 14.62 |
| — | — | — | — | 2 | 129,711 | 0.28 |
| — | — | — | — | 1 | 229,364 | 0.50 |
| — | — | — | — | 7 | 4,588,891 | 10.00 |
| 21 | 56,253 | 118,488 | 174,741 | 30 | 6,063,002 | 13.19 |
| 7 | 160,242 | — | 160,242 | 7 | 160,242 | 0.35 |
| 1 | 1,395 | — | 1,395 | 1 | 1,395 | — |
| 2 | 10,672 | 20,176 | 30,848 | 2 | 30,848 | 0.07 |
| 1 | — | 11,133 | 11,133 | 1 | 11,133 | 0.02 |
| 2 | 6,747 | — | 6,747 | 5 | 746,882 | 1.63 |
| 6 | 11,411 | 10,092 | 21,503 | 9 | 1,089,287 | 2.37 |
| — | — | — | — | 1 | 1,369,093 | 2.98 |
| — | — | — | — | 1 | 840,927 | 1.83 |
| 1 | 30,675 | — | 30,675 | 4 | 1,125,720 | 2.45 |
| 7 | 6,120 | 6,683 | 12,803 | 7 | 12,803 | 0.03 |
| 2 | — | 4,059 | 4,059 | 2 | 4,059 | 0.01 |
| 1 | 33,710 | — | 33,710 | 1 | 33,710 | 0.07 |
| — | — | — | — | 6 | 1,044,091 | 2.27 |
| 3 | 15,610 | — | 15,610 | 6 | 1,032,078 | 2.25 |
| — | — | — | — | 1 | 152,075 | 0.33 |
| 4 | 13,960 | — | 13,960 | 4 | 13,960 | 0.03 |
| — | — | — | — | 1 | 1,632,211 | 3.55 |
| 18 | 59,273 | 312,389 | 371,662 | 18 | 371,662 | 0.81 |
| 2 | 656 | — | 656 | 11 | 3,996,200 | 8.70 |
| 1 | 5,333 | — | 5,333 | 6 | 1,378,637 | 3.00 |
| 11 | 121,553 | 601,231 | 722,784 | 18 | 3,507,536 | 7.63 |
| 8 | 57,828 | 60,747 | 118,575 | 16 | 2,976,213 | 6.45 |
| 4 | 142,304 | — | 142,304 | 4 | 142,304 | 0.30 |
| 5 | 18,593 | 8,947 | 27,540 | 5 | 27,540 | 0.06 |
| 2 | 11,153 | — | 11,153 | 2 | 11,153 | 0.02 |
| 11 | 34,238 | 29,657 | 63,895 | 13 | 849,754 | 1.85 |
| 1 | 979 | — | 979 | 1 | 979 | — |
| 1 | 9,218 | — | 9,218 | 2 | 21,201 | 0.05 |
| — | — | — | — | 1 | 136,083 | 0.30 |
| 13 | 126,268 | 1,000 | 127,268 | 33 | 5,513,246 | 12.00 |
| 135 | 934,191 | 1,184,602 | 2,118,793 | 232 | 45,966,114 | 100.00 |

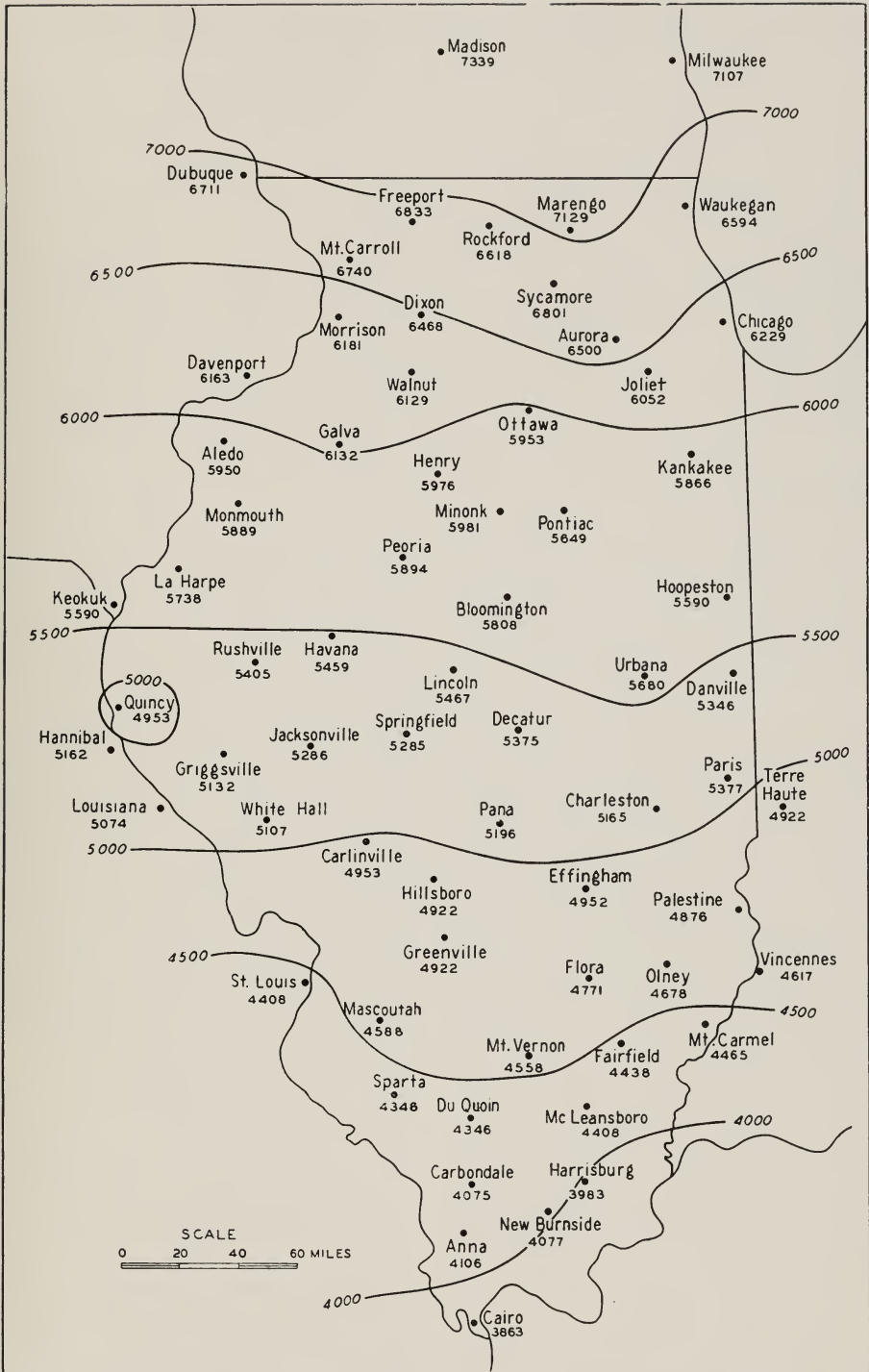


FIG. 7.—Degree-day map of Illinois and adjacent region showing cumulative average degree-days (based on data through 1941). Degree-days are the number of degrees that the average daily temperature falls below 65°F. totaled for the heating season.

TABLE 8.—NATIONAL CONSUMPTION OF BITUMINOUS COAL^a

| Consumer | Amount used (Thousands of tons) | | | Percent of 1953 Total |
|-----------------------------------|------------------------------------|---------|-------------------|-----------------------------|
| | 1951 | 1952* | 1953 ^b | |
| Electric power utilities. | 101,898 | 103,309 | 112,278 | 26.3 |
| Coke ovens | 102,030 | 90,702 | 104,199 | 24.4 |
| Beehive coke ovens | 11,418 | 6,912 | 8,179 | 1.9 |
| Steel and rolling mills | 7,973 | 6,820 | 6,207 | 1.5 |
| Cement mills | 8,525 | 8,073 | 8,344 | 2.0 |
| Other industrial | 105,634 | 95,863 | 97,437 | 22.9 |
| Railroads (Class I). | 54,005 | 37,962 | 27,735 | 6.5 |
| Bunker fuel | 890 | 723 | 611 | 0.1 |
| Retail deliveries | 76,531 | 68,393 | 61,295 | 14.4 |
| Total | 468,904 | 418,757 | 426,285 | 100.0 |

* Revised figures.

^a Source: U. S. Bureau of Mines.^b Preliminary figures.

cumulated during the heating season and the quantity of fuels consumed, a degree-day map of Illinois showing degree-day figures is useful in estimating domestic fuel consumption (fig. 7).

COKE INDUSTRY

The primary use of coke is in reducing iron ores to metal. Whatever other uses may have been found for coke are only incidental in the economic significance of this material. The reduction of iron ore in the blast furnace using coke as a fuel is so far superior in terms of economy to any other method that there are no rivals. This is of fundamental significance, for it leaves us at present with only one method of obtaining iron cheaply. The other uses of coke such as house-heating and gas-making are refinements in a technology which became possible only after low-cost smelting of iron ores was developed. Coal from which coke can be produced is comparatively limited in quantity, and therefore coking coals have high value and will increase in value in the future.

COKE IN 1953

According to data submitted to the United States Bureau of Mines by the coke industry, production of oven and beehive coke in the United States in 1953 totaled 78.8 million tons. This total was about 16 percent higher than the 1952

figure of 68.2 million tons, but was one-half million tons below the record production in 1951 of 79.3 million tons. Although combined production of oven and beehive coke failed to set a new record in 1953, output of oven coke reached a new high—exceeding the previous maximum of 1951 by 1.6 million tons. Production of coal chemicals in most instances followed the gain in oven-coke output. Because the production of coke is a measure of the general productiveness of the country, it should be noted that the industry in 1953 experienced one of the best construction years since World War I. About 1.8 million tons of slot-type capacity was gained during 1953, and at the end of the year slot-type capacity totaled about 78.3 million tons.

Table 10 gives detailed data for coke in Illinois in 1953.

TABLE 9.—UNITED STATES EXPORTS OF BITUMINOUS COAL^a
(In thousands of tons)

| Year | Amount | Year | Amount |
|-------------|----------|-------------------------|----------|
| 1944. . . . | 26,032.3 | 1949. . . . | 27,842.1 |
| 1945. . . . | 27,956.2 | 1950. . . . | 25,468.4 |
| 1946. . . . | 41,208.6 | 1951. . . . | 56,726.2 |
| 1947. . . . | 68,667.0 | 1952* . . . | 47,643.2 |
| 1948. . . . | 45,930.1 | 1953 ^b . . . | 33,766.6 |

* Revised figure.

^a Source: U. S. Bureau of Mines.^b Preliminary figure.

TABLE 10.—COKE AND BY-PRODUCTS USED OR SOLD BY PRODUCERS IN ILLINOIS, 1953^a

| | 1953 | | |
|---|----------|----------------------|---------|
| | Quantity | Value at plants | |
| | | Thousands of dollars | Average |
| Coke produced (M tons) | 3,513 | \$59,550 | \$16.95 |
| Coal used (M tons) | 4,938 | 52,418 | 10.61 |
| Coal per ton of coke (tons) | 1.41 | — | 14.92 |
| Yield of coke (percent of coal used) | 71.14 | — | — |
| Coke breeze recovered (M tons) | 289 | 1,137 | 3.93 |
| Coke used by producers in blast furnaces (M tons) | 2,025 | 31,173 | 15.39 |
| Coke sold for furnace use (M tons) | 1,125 | 21,477 | 19.09 |
| Coke and coke breeze used for all other purposes | 603 | 7,236 | 12.00 |
| Total coke and breeze used or sold | 3,753 | 59,886 | 16.04 |
| By-products used or sold | — | 12,782 | — |
| Total coke and by-products used or sold | | 72,668 | |

^a Source: U. S. Bureau of Mines.TABLE 11.—SOURCES OF COAL USED FOR PRODUCING COKE IN ILLINOIS^a
(In tons)

| Source | 1952 | 1953 |
|-------------------------|-----------|-----------|
| Illinois | 439,310 | 405,344 |
| Kentucky | 1,948,068 | 2,112,243 |
| Pennsylvania | 22,654 | 20,118 |
| Virginia | 105,546 | 156,100 |
| West Virginia | 2,225,565 | 2,353,495 |
| Total | 4,741,143 | 5,047,300 |

^a Source: U. S. Bureau of Mines.

PETROLEUM INDUSTRY

Today's petroleum industry had its beginning in the hills of northwestern Pennsylvania in the year 1859. Several factors helped to pace this new industry into a fast-moving adventure where fortunes might be made quickly. When it was found that crude oil could be refined to produce kerosene, an illuminant superior to others of the time, demand for petroleum grew rapidly. Also, the need for a plentiful supply of lubricants for the many new machines which were producing goods for an expanding country enhanced the growth of the petroleum industry.

Only about 2,000 barrels of crude oil was produced that first year, but demand for petroleum products grew rapidly. By 1900, yearly production of crude oil had risen to some 63 million barrels and yet further demands for petroleum products came from the new automobile industry. Farm mechanization, which began during World War I, also intensified demand for petroleum products.

In addition to these factors, the advent of oil-burning locomotives and ships, the use of oil burners for home heating, and the growth in use of diesel engines and aircraft broadened the market still further. By 1940 output of crude oil had climbed to about 1.3 billion barrels annually, and the peak production of World War II reached 1.7 billion barrels in 1945. The average annual production of crude oil in the United States from 1946 through 1953 has been about 2 billion barrels.

PRODUCTION IN 1953

Production of crude oil in the United States in 1953 established another all-time high for total volume and marked the third successive year that the total has exceeded two billion barrels (table 12). The only previous year during which two billion barrels of oil was produced was 1948.

During 1953, according to preliminary figures, 2,360 million barrels of crude oil was produced. This amount is 3 percent more than the total produced in 1952 and some 43 percent greater than the 1940-1949 annual average. In all there were 27

producing states in 1953; Texas was the foremost producer, accounting for over 43 percent of all crude oil output. Most of the states which ordinarily make substantial contributions to the nation's crude oil supply showed increased production during 1953.

Drilling activity in the United States in 1953 showed an increase over the very active year of 1952. In considering wells classified as oil wells, gas wells, or dry holes, present figures indicate a total of 44,398 wells completed in 1952, of which 17,677 were dry holes, about 40 percent. During 1953, 48,020 wells were drilled and 18,452 of this total were completed as dry holes, slightly over 38 percent.

Oil reserves.—Although production of crude oil in 1953 set an all-time record, estimated reserves increased from 27,960 million barrels at the beginning of 1953 to 28,945 million barrels at the beginning of 1954 for the United States. The increase is about twice the gain reported at the beginning of 1953. Estimated reserves of crude oil in Illinois and the seven other states serving the Illinois area are shown in table 17. For 1954 these eight states as a group show a gain of about 3.5 percent over the 1953 total figure: the percentage gain corresponds to the percentage gain recorded for the United States.

World reserves of crude oil are at present rated at about 135 billion barrels. Of these reserves the Middle East is reported to possess about 57.8 percent; the United States about 21.5 percent; Venezuela approximately 7.3 percent; other Western Hemisphere countries about 3.9 percent; Communist-controlled areas about 7.1 percent; and other areas of the world about 2.4 percent.

Natural gas reserves.—Natural gas during 1953 follows a pattern similar to that of crude oil—a year of new records. Production of natural gas for the year 1953 was reported at 9.2 trillion c.f., up almost 600 billion c.f. from 1952. Reserves for the United States at the beginning of 1954 scored an all-time high of 211.4 trillion c.f., a gain for the year of almost 12 trillion c.f. It has been reported that additions to natural gas reserves still exceed consump-

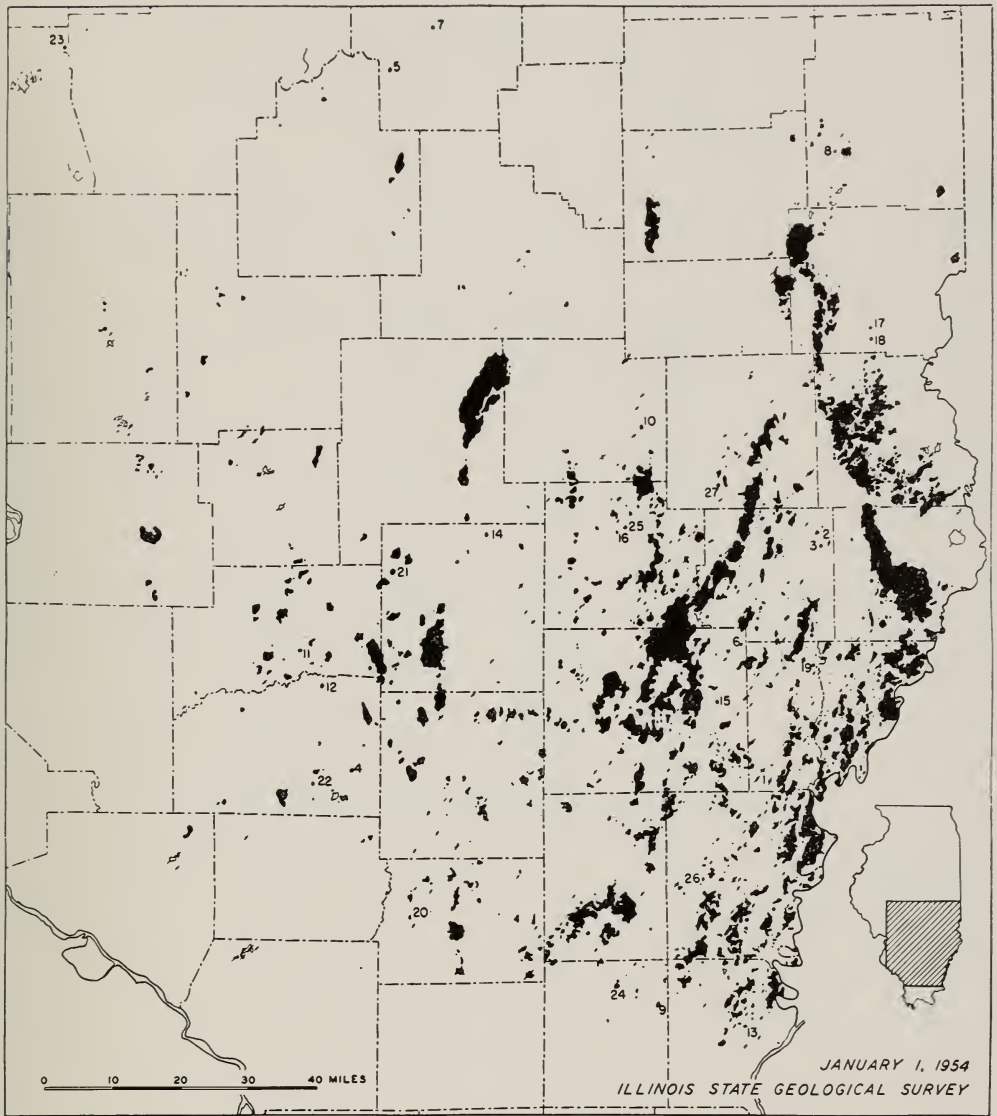


FIG. 8.—New oil pools discovered in Illinois in 1953.

- | | |
|------------------------|-------------------------|
| 1. Albion West | 15. Locust Grove South |
| 2. Amity South | 16. Louisville North |
| 3. Amity West | 17. Melrose |
| 4. Ashley | 18. Melrose South |
| 5. Blackland | 19. Mills Prairie North |
| 6. Calhoun South | 20. North City |
| 7. Decatur | 21. Patoka South |
| 8. Dudley West | 22. Posen North |
| 9. Eldorado East | 23. Prentice |
| 10. Elliottstown North | 24. Raleigh |
| 11. Huey South | 25. Toliver South |
| 12. Irvington North | 26. Trumbull West |
| 13. Junction East | 27. Wakefield North |
| 14. Kinmundy North | |

TABLE 12.—PRODUCTION OF CRUDE PETROLEUM BY STATES^a
(In thousands of barrels)

| State | 1940-1949 av. annual production | 1950 | 1951 | 1952* | 1953 ^b | Percent of 1953 Total |
|--------------------------------------|---------------------------------------|-----------|-----------|--------------------|--------------------|-----------------------------|
| Alabama | ^c | 735 | 1,020 | 1,279 | 1,694 | — |
| Arkansas | 28,435 | 31,108 | 29,798 | 29,440 | 29,681 | 1.3 |
| California | 294,579 | 327,607 | 354,561 | 359,450 | 364,933 | 15.5 |
| Colorado | 8,542 | 23,303 | 27,823 | 30,381 | 32,331 | 1.4 |
| Florida | ^c | 487 | 596 | 591 | 537 | — |
| Illinois | 89,226 | 62,028 | 60,243 | 60,089 | 58,886 | 2.5 |
| Indiana | 6,389 | 10,699 | 11,100 | 12,037 | 13,013 | 0.6 |
| Kansas | 96,350 | 107,586 | 114,522 | 114,807 | 115,259 | 4.9 |
| Kentucky | 7,989 | 10,381 | 11,622 | 11,918 | 11,618 | 0.5 |
| Louisiana | 139,565 | 208,965 | 232,281 | 243,929 | 255,692 | 10.8 |
| Michigan | 18,107 | 15,826 | 13,927 | 13,251 | 12,284 | 0.5 |
| Mississippi | 24,572 | 38,236 | 37,039 | 36,310 | 35,425 | 1.5 |
| Montana | 8,338 | 8,109 | 8,958 | 9,606 | 11,630 | 0.5 |
| Nebraska | 584 | 1,547 | 2,558 | 2,660 | 6,257 | 0.3 |
| New Mexico | 39,940 | 47,367 | 52,719 | 58,681 | 70,394 | 3.0 |
| New York | 4,868 | 4,143 | 4,254 | 4,242 | 3,800 | 0.2 |
| Ohio | 3,240 | 3,383 | 3,140 | 3,350 | 3,550 | 0.2 |
| Oklahoma | 142,055 | 164,599 | 186,869 | 190,435 | 202,570 | 8.6 |
| Pennsylvania | 14,400 | 11,859 | 11,345 | 11,233 | 10,669 | 0.4 |
| Texas | 680,639 | 829,874 | 1,010,270 | 1,022,139 | 1,024,780 | 43.4 |
| Utah | ^c | 1,228 | 1,305 | 1,737 | 1,807 | — |
| West Virginia | 3,083 | 2,808 | 2,757 | 2,602 | 3,038 | 0.1 |
| Wyoming | 37,890 | 61,631 | 68,929 | 68,074 | 84,918 | 3.6 |
| Other states | 442 | 65 | 75 | 1,595 ^d | 5,232 ^d | 0.2 |
| Total | 1,649,233 | 1,973,574 | 2,247,711 | 2,289,836 | 2,359,998 | 100.0 |
| Percent change from previous year | | | +13.9 | + 1.8 | + 3.0 | |

* Revised figures.

^a Source: U. S. Bureau of Mines.^b Preliminary figures.^c Average production included under other states.^d North Dakota: 1,549 in 1952 and 5,183 in 1953.

tion, but the percentage gain in consumption is consistently greater than the percentage increase in reserves. Table 18 shows the reserves of natural gas reported in Illinois and other states.

Liquefied petroleum gas.—Total sales of liquefied petroleum gas for 1953 reached almost 5 billion gallons, up about 10 percent over 1952, and set a new high in sales for the thirty-second consecutive year. This illustrates the tremendous expansion of the liquefied petroleum gas industry since its first year, during which only about 223 thousand gallons were sold.

ILLINOIS DEVELOPMENTS

The multimillion-dollar plant of the National Petro-Chemicals Corp. at Tuscola, Ill., designed for the processing of natural gas, came into operation officially during 1953. Units of the large plant in operation include:

(1) An extraction unit to handle 400 million c.f. of gas per day.

(2) A fractionating plant for the production of ethane, propane, butane, and gasoline.

(3) An ethylene unit turning out hydrogen, light hydrocarbons, and benzene.

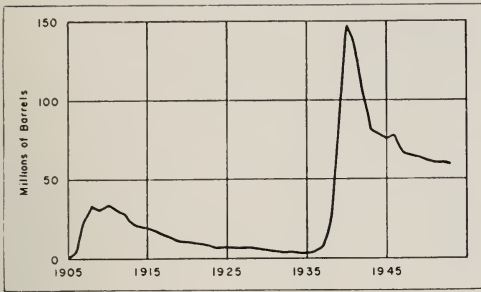


FIG. 9.—Illinois production of crude petroleum, 1905–1953.

(+) An alcohol plant and a unit to produce a by-product of ethyl ether.

Ethyl chloride facilities and ammonia units are planned.

New pipeline.—Officially opened in 1953 was the Platte Pipe Line, 1,149 miles long, 20 inches in diameter, and capable of delivering 150 thousand barrels of crude oil daily. The line runs from the western

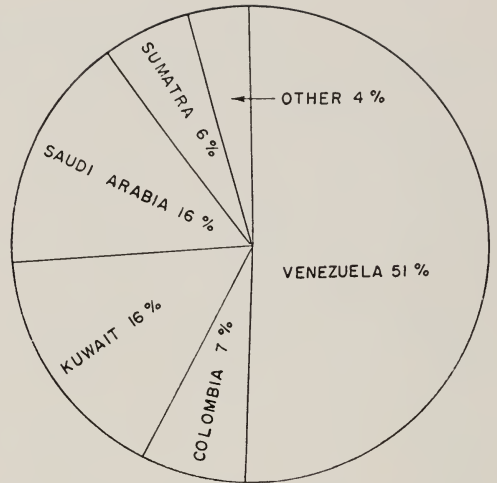


FIG. 10.—Source of United States crude petroleum imports, 1953.

edge of Wyoming to Wood River, Ill., and provides economical transportation for Rocky Mountain crudes to Midwest refineries.

TABLE 13.—ILLINOIS WELL COMPLETIONS AND PRODUCTION^a

| Year | Completions ^b | Producing wells ^c | Production (thousands of barrels) | | |
|----------------|--------------------------|------------------------------|-----------------------------------|----------------------------|--------------------|
| | | | New fields ^c | Old fields ^{c, d} | Total ^e |
| 1936 | 93 | 52 | — | — | 4,445 |
| 1937 | 449 | 292 | 2,884 | 4,542 | 7,426 |
| 1938 | 2,536 | 2,010 | 19,771 | 4,304 | 24,075 |
| 1939 | 3,617 | 2,970 | 90,908 | 4,004 | 94,912 |
| 1940 | 3,755 | 3,080 | 142,969 | 4,678 | 147,647 |
| 1941 | 3,807 | 2,925 | 128,993 | 5,145 | 134,138 |
| 1942 | 2,017 | 1,179 | 101,837 | 4,753 | 106,590 |
| 1943 | 1,791 | 1,090 (20) | 77,581 | 4,675 | 82,256 |
| 1944 | 1,991 | 1,229 (12) | 72,946 | 4,467 | 77,413 |
| 1945 | 1,763 | 1,094 (15) | 70,839 | 4,371 | 75,210 |
| 1946 | 2,362 | 1,387 (17) | 70,174 | 5,123 | 75,297 |
| 1947 | 2,046 | 1,102 (22) | 61,455 | 5,004 | 66,459 |
| 1948 | 2,489 | 1,316 (21) | 59,623 | 5,185 | 64,808 |
| 1949 | 2,741 | 1,447 (32) | 58,571 | 5,930 | 64,501 |
| 1950 | 2,894 | 1,328 (23) | 55,794 | 6,234 | 62,028 |
| 1951 | 2,383 | 947 (23) | 54,147 | 6,097 | 60,244 |
| 1952 | 2,077 | 854 (35) | 53,727 | 6,344 | 60,071 |
| 1953 | 2,161 | 1,161 (88) | 51,924 | 7,101 | 59,025 |

^a Source: Illinois State Geological Survey.

^b Includes only oil and gas producers and dry holes.

^c Production figures based on information furnished by oil companies and pipeline companies.

^d Includes Devonian production at Sandoval and Bartelso.

^e From the U. S. Bureau of Mines through 1950.

^f Figures in parenthesis refer to number of producing wells included in total which had previously been completed as dry holes.

TABLE 14.—ESTIMATED OIL PRODUCTION BY ILLINOIS COUNTIES^a
(In thousands of barrels)

| County | 1949 | 1950 | 1951 | 1952 | 1953 |
|-----------------------------|--------------|--------|--------------|--------|---------------------|
| Bond | 86 | 115 | 107 | 92 | 80 |
| Christian | 1,099 | 1,219 | 822 | 528 | 487 |
| Clark | 1,481 | 1,897 | 1,434 | 1,755 | 1,340 ^c |
| Clay | 5,240 | 4,256 | 4,245 | 3,978 | 4,042 |
| Clinton | 2,305 | 1,879 | 1,820 | 1,151 | 1,502 |
| Coles | 779 | 597 | 464 | 392 | 379 |
| Crawford | 1,388 | 1,527 | 1,518 | 1,715 | 2,055 |
| Cumberland | 29 | 19 | 13 | 12 | 7 |
| Edgar | 132 | 596 | 373 | 270 | 184 |
| Edwards | 1,255 | 1,380 | 1,878 | 1,472 | 1,820 |
| Effingham | 486 | 619 | 441 | 388 | 444 |
| Fayette | 6,631 | 7,722 | 6,545 | 6,006 | 5,629 |
| Franklin | 2,034 | 1,687 | 3,168 | 3,704 | 2,996 |
| Gallatin | 3,057 | 1,914 | 1,635 | 1,463 | 1,465 |
| Hamilton | 3,346 | 3,887 | 4,626 | 4,098 | 3,441 |
| Hancock-McDonough | 76 | 75 | 74 | 78 | 72 |
| Jackson | ^b | 0 | ^b | 0 | 0 |
| Jasper | 2,036 | 1,033 | 996 | 888 | 977 |
| Jefferson | 3,003 | 2,477 | 2,063 | 1,990 | 2,012 |
| Lawrence | 2,032 | 2,892 | 2,673 | 2,757 | 3,340 |
| Macoupin | 1 | 1 | 2 | 2 | 3 |
| Madison | 1,174 | 1,044 | 944 | 807 | 669 |
| Marion | 5,573 | 5,505 | 5,019 | 5,638 | 4,411 |
| Monroe | 1 | 0 | 0 | 0 | 0 |
| Montgomery | 3 | 6 | 2 | 12 | 8 |
| Perry | 3 | 2 | 3 | 52 | 50 |
| Randolph | 0 | 0 | 0 | 412 | 518 |
| Richland | 2,793 | 3,164 | 3,061 | 2,852 | 3,626 |
| St. Clair | 106 | 75 | 80 | 47 | 50 |
| Saline | 27 | 49 | 61 | 65 | 204 |
| Shelby | 47 | 38 | 33 | 33 | 28 |
| Wabash | 5,906 | 3,488 | 3,356 | 3,464 | 2,812 |
| Washington | 475 | 420 | 917 | 1,045 | 1,105 |
| Wayne | 5,951 | 6,360 | 5,651 | 6,154 | 6,024 |
| White | 5,946 | 6,085 | 6,220 | 6,751 | 7,243 |
| Total | 64,501 | 62,028 | 60,244 | 60,071 | 59,025 ^d |

^a Calculated by Illinois State Geological Survey from reports of Illinois Basin Scout Association.^b Less than one thousand barrels.^c Some Cumberland County production included with Clark County.^d Includes 2,000 barrels from Macon County.

TABLE 15.—PRODUCTION OF NATURAL GASOLINE AND ALLIED PRODUCTS
IN ILLINOIS AND OTHER STATES^a
(In thousands of barrels)

| State | 1950 | 1951 | 1952* | 1953 ^b | Percent change from 1952 |
|--------------------|--------|--------------------|--------------------|--------------------|--------------------------------|
| Illinois | 3,107 | 2,971 ^c | 2,826 ^c | 3,860 ^c | + 36.6 |
| Kansas | 3,687 | 4,266 | 4,586 | 5,152 ^d | + 12.3 |
| Kentucky | 1,779 | 2,166 | 4,449 | 5,039 | + 13.3 |
| Ohio | 103 | 107 | 38 | 11 | — 71.0 |
| Oklahoma | 14,733 | 17,542 | 18,613 | 20,183 | + 8.4 |
| Total | 23,488 | 27,052 | 30,512 | 34,245 | + 12.2 |

* Revised figures.

^a Source: U. S. Bureau of Mines.

^b Preliminary figures.

^c Michigan included with Illinois.

^d Nebraska included with Kansas.

TABLE 16.—GASOLINE CONSUMPTION IN ILLINOIS AND THE UNITED STATES^a
(In thousands of barrels)

| | 1949 | 1950 | 1951 | 1952 | 1953 ^b |
|---|---------|---------|-----------|-----------|-------------------|
| Illinois total | 49,743 | 54,276 | 56,564 | 58,219 | 60,595 |
| United States total | 893,221 | 967,078 | 1,046,074 | 1,105,432 | 1,177,788 |
| Percent of U.S. total consumed in Illinois | 5.6 | 5.6 | 5.4 | 5.3 | 5.1 |

^a Source: American Petroleum Institute.

^b Preliminary figures.

TABLE 17.—ESTIMATES OF OIL RESERVES IN STATES SERVING THE ILLINOIS AREA^a
(In millions of barrels)

| State | 1950 | 1951 | 1952 | 1953 | 1954 | Percent change from 1953 |
|----------------------|--------|--------|--------|--------|--------|--------------------------------|
| Illinois | 468 | 564 | 646 | 619 | 625 | + 1.0 |
| Indiana | 50 | 57 | 51 | 56 | 62 | + 10.7 |
| Kansas | 738 | 732 | 792 | 917 | 913 | — 0.4 |
| Louisiana | 1,910 | 2,185 | 2,285 | 2,558 | 2,760 | + 8.0 |
| New Mexico | 592 | 592 | 612 | 733 | 815 | + 11.2 |
| Oklahoma | 1,330 | 1,397 | 1,476 | 1,558 | 1,752 | + 12.5 |
| Texas | 13,510 | 13,582 | 15,315 | 14,916 | 14,999 | + 0.6 |
| Wyoming | 692 | 841 | 973 | 1,065 | 1,279 | + 20.0 |

^a Source: American Petroleum Institute; figures as of January 1.

Gas storage.—The Herscher, Ill., underground gas storage project, now in operation, will no doubt help solve the gas industry's seasonal problem of storing gas when the Chicago area demands fall off in the summer. Gas supplied from the Texas-Illinois Natural Gas Pipeline is stored in a water-sands reservoir reported to have a capacity of about 90 billion c.f. Among the various economic considerations involved in storing gas for space heating is the probability that users of interruptible gas will lose their supplies to storage because the rates for space-heating fuel are higher.

Water flooding.—This method of increasing oil recovery in Illinois has been playing a more important role year after year ever since water flooding was legalized in Illinois on June 8, 1933. As a means of secondary oil recovery this method no doubt will have widespread effect on future oil production in Illinois. During 1952 about 11 million barrels of oil was recovered by water flooding methods—about 18 percent of the State's 60 million barrel total production for the year.

At present less than 10 percent of Illinois' total productive acreage is being flooded; however, recent water flood successes indicate a substantial future for its proper application. According to conservative estimates secondary recovery operations in Illinois will ultimately produce 800 million barrels of oil that could not have been recovered otherwise. In all, approximately 41 million barrels of water flood oil has been recovered in Illinois.

One of the largest and most complex water flood operations ever undertaken, from the standpoint of volume of water for injection, number of injection wells, and number of producing wells is under way at Salem, Ill.

ILLINOIS PRODUCTION IN 1952 AND 1953

In 1952 Illinois produced about 60.1 million barrels of crude oil, or about 2.6 percent of the total for the United States (table 12). For 1953, Illinois' percentage

of the national total dropped slightly to 2.5 percent. For eight consecutive years before 1951 Illinois had ranked sixth in the nation for volume of production; however, during 1951 Wyoming edged ahead and placed Illinois in seventh position. According to preliminary figures for 1953, Illinois is now in eighth position because of increased production in New Mexico.

During 1952 total well completions in Illinois numbered 2,077, a decrease of 306 wells, or about 13 percent fewer than the 2,383 wells drilled in 1951. Well completions during 1953 amounted to 2,161, an increase of 84 wells over the 1952 total. However, the number of wells drilled during 1950 in Illinois, a total of 2,894, is the largest recorded since the peak of drilling activity in 1941, when 3,807 completions were made.

A history of oil production and drilling activity since the new fields were discovered is given in table 13; county production figures for the years 1949 through the 1953 are given in table 14. Figure 8 shows the new fields discovered in 1953. Illinois production is graphically illustrated in figure 9. The sharp production rise reflects the opening of the Illinois Basin in 1936.

Crude oil prices for Illinois and adjacent portions of Indiana and Kentucky are shown in table 19. These figures reflect the general price increase per barrel of crude oil which occurred on June 15, 1953.

CRUDE OIL IMPORTS

A review of the United States crude oil imports for the years 1949 to 1953 is given in table 20. As indicated by these figures the country of Venezuela is the foremost supplier of our imported crude oil. However, it is interesting to note that substantial quantities of oil are now coming from the Persian Gulf area. Sumatra has started to export oil to the United States, and during 1953 supplied almost 6 percent of our crude oil imports (fig. 10). Also exporting oil to the United States is Canada, a recent entrant into the import pattern of this country.

TABLE 18.—ESTIMATES OF NATURAL GAS RESERVES IN ILLINOIS AND OTHER STATES^a
(In billions of cubic feet)

| State | 1951 | 1952 | 1953 | 1954 | Percent change from 1953 |
|----------------------|---------|---------|---------|---------|--------------------------------|
| Illinois | 230 | 227 | 212 | 231 | + 9.0 |
| Indiana | 31 | 31 | 37 | 36 | — 2.7 |
| Kansas | 13,791 | 13,457 | 14,194 | 15,788 | + 11.2 |
| Kentucky | 1,331 | 1,326 | 1,314 | 1,302 | — 0.9 |
| Louisiana | 28,533 | 29,005 | 31,452 | 34,459 | + 9.5 |
| New Mexico | 6,991 | 11,590 | 14,039 | 17,522 | + 24.8 |
| Oklahoma | 11,634 | 11,804 | 11,765 | 12,228 | + 4.0 |
| Texas | 102,404 | 105,653 | 105,733 | 106,530 | + 0.7 |
| Wyoming | 2,195 | 2,340 | 2,321 | 2,740 | + 18.0 |

^a Source: American Gas Association: figures as of January 1.

TABLE 19.—CRUDE OIL PRICES^a

| | |
|--|---------------------|
| Illinois | |
| Eastern Illinois (Ohio Oil) | 1c below Schedule J |
| Illinois Basin (Ashland, Cities Service, Continental, Gulf, Magnolia, Ohio Oil, Pure, Shell, Texaco) | \$3.02 |
| Loudon Pool (Carter) | 3.02 |
| Mattoon Pool (Carter) | 3.02 |
| Plymouth (Ohio Oil) | 2.69 |
| Indiana | |
| Indiana Basin (Ashland, Pure) | 3.02 |
| Western Indiana (Ohio Oil) | 1c below Schedule J |
| Kentucky | |
| Butler Co. Area (Owensboro-Ashland) | 2.65 |
| Owensboro Area (Ashland) | 3.02 |
| Ragland Grade (Ashland) | 2.62 |
| Somerset Grade (Ashland) | 3.02 |

^a Source: National Petroleum News, vol. 46, no. 17, April 28, 1954.

TABLE 20.—UNITED STATES CRUDE OIL IMPORTS^a
(In thousands of barrels)

| From | 1949 | 1950 | 1951 | 1952 | 1953 | Percent of 1953 total |
|--|---------|---------|---------|---------|---------|-----------------------------|
| Borneo | — | — | 3,498 | 1,624 | — | — |
| Canada | — | — | 463 | 1,116 | 2,527 | 1.1 |
| Colombia | 11,678 | 16,159 | 16,312 | 16,209 | 15,860 | 6.7 |
| Curacao and Aruba | 613 | 611 | — | — | — | — |
| Ecuador | — | — | — | — | 90 | — |
| Iran | 1,107 | 111 | — | — | — | — |
| Iraq | 341 | — | — | 705 | 2,287 | 1.0 |
| Kuwait | 23,445 | 26,741 | 21,601 | 26,444 | 38,336 | 16.2 |
| Mexico | 4,797 | 12,307 | 13,862 | 8,483 | 2,897 | 1.2 |
| Qatar | — | 116 | — | — | 2,756 | 1.2 |
| Saudi Arabia | 12,057 | 14,650 | 15,900 | 29,407 | 37,179 | 15.7 |
| Sumatra | — | — | — | 3,640 | 13,969 | 5.9 |
| Venezuela | 99,648 | 107,019 | 107,437 | 121,963 | 120,675 | 51.0 |
| Total | 153,686 | 177,714 | 179,073 | 209,591 | 236,576 | 100.0 |
| Percent change from previous year | | + 15.6 | + 0.8 | + 17.0 | + 12.9 | |

^a Source: U. S. Bureau of Mines.

MINERALS IN AGRICULTURE

Indispensable as a foundation of an enduring productive economy is a sustained and assured supply of food at low cost. Low-cost food is a resultant of several factors—fertile soil, level or gently rolling topography, mechanization of agriculture, and low-cost transportation. These conditions are met in a superior manner in the upper Mississippi Valley. Upon the level prairies and cleared woodlands, vast and almost unbroken by wasteland, mechanization in agriculture has achieved its highest degree of development. The topography has favored low-cost transportation and encourages alternative methods of transportation. Both rail and highway transportation play an important role in the cost of assembling food materials and of distributing food products.

Highly fertile soil heightens the productivity of mechanized agriculture; each acre operation results in a high yield per man-day effort. "Use of tractor and motor power has, since 1920, released more than 60 million acres of crop and pasture land from feed production for work stock into production of commodities for sale. If the trend away from horses and mules continues until 1950, another 8 to 10 million acres will be made available for commercial production" (Tolley, 1945, p. 17). A large part of this change has occurred in the states of the upper Mississippi Valley. Census figures for the past thirty years show a consistent decline in the number of horses and mules on farms in those states, from 10.0 million in 1920 to 2.1 million in 1950, a decrease of almost 80 percent.

Minerals aid the farmer in three ways: (1) they increase the productivity of the

soil, (2) they combat plant disease and insect enemies which seek to destroy the growing plant, and (3) they power the farmer's machines and increase his output per man-day by the use of machinery.

SOIL FERTILIZERS AND SOIL PRODUCTIVITY

Fourteen elements are needed for plant growth: nitrogen, carbon, hydrogen, oxygen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, zinc, and boron. The last five are needed only in small quantities. Even though almost all the soils of Illinois are of high fertility, the use of fertilizer materials is increasing rapidly.

Potash.—The use of potash on Illinois farms is increasing rapidly, as shown in the record for the years 1946 to 1952 in table 21. In fact, Illinois in 1952 was first among the states in consumption of agricultural potash and accounted for 10.6 percent of the national total.

Most of the potash fertilizer sold to farmers is in the form of muriate of potash.

Phosphates.—Phosphate fertilizers in Illinois make up, next to agricultural limestone, the largest tonnage. Illinois is the largest user of rock phosphate among the states, but is a comparatively small user of forms of superphosphate. For the year ending June 30, 1952, consumption of rock phosphate in Illinois, as reported by the U.S. Department of Agriculture, was 646,576 tons, and the U.S. total was 1,160,020 tons. Illinois consumed 52,065 tons of the national total of 1,449,349 tons of superphosphate.

Nitrogen.—The use of nitrogen on Illinois farms is increasing and promises to become an important factor in the agricultural economy of Illinois. Nitrogen compounds for fertilizer are obtained mainly from three sources: by-product ammonium sulfate from coke-oven operations, sodium nitrate imported from Chile, and synthetic nitrogen compounds. Of these three, the last is the most important present source and will become even more important in the future. The comparative importance of each of these sources is indicated by production and imports over the past decade (table 22).

TABLE 21.—CONSUMPTION OF AGRICULTURAL POTASH (as K₂O) IN ILLINOIS^a

| Year | Tons as K ₂ O |
|----------------|--------------------------|
| 1946 | 64,222 |
| 1947 | 77,486 |
| 1948 | 83,111 |
| 1949 | 78,547 |
| 1950 | 114,279 |
| 1951 | 136,783 |
| 1952 | 168,826 |

^a Source: U.S. Bureau of Mines.

TABLE 22.—THREE MAJOR SOURCES OF NITROGEN FOR UNITED STATES CONSUMPTION^a

| Year | Synthetic anhydrous ammonia NH ₃ | By-product NH ₃ from coking plants | Sodium nitrate imports |
|---------------------|---|---|------------------------------|
| 1943-47 av. | 695,129 | 218,667 | 709,573 |
| 1948 | 1,089,786 | 232,424 | 675,543 |
| 1949 | 1,294,057 | 211,952 | 618,018 |
| 1950 | 1,565,569 | 231,141 | 737,324 |
| 1951 | 1,777,074 | 249,444 | 675,329 |
| 1952 | 2,052,114 | 222,663 | |

^a Source: U. S. Bureau of Mines.

STONE INDUSTRY

The output of stone in Illinois is presented in tables 23 to 25. The largest market for stone is the construction industry. In this group, the use of stone in road building leads all others.

The second largest market is in agriculture. Illinois is a leading state in the use of dolomite and limestone for soil conditioning. Although agstone is used primarily to neutralize soil acidity, it is also an important factor in soil conservation. Erosion control crops such as clovers and alfalfa thrive on soils which have been treated to correct acid conditions by the application of limestone.

The use of limestone has consistently increased since its introduction. The trend of demand is likely to be upward in spite of the recessions of the last three years. Crop yields will increase as a result of the expanding use of plant foods and the increased yields will be a heavier drain on the lime content of soils, which will need to be replenished.

In the Chicago area the iron and steel industry is a large user of metallurgical stone and constitutes a market for several stone producers in Cook County and vicinity.

TABLE 23.—LIMESTONE AND DOLOMITE

| Use | 1952* | | | 1953 ^a | | |
|-----------------------------------|------------|--------------|---------|-------------------|--------------|---------|
| | Tons | Value | | Tons | Value | |
| | | Total | Av. | | Total | Av. |
| Agricultural | 3,374,000 | \$ 4,435,100 | \$ 1.31 | 3,725,000 | \$ 4,842,500 | \$ 1.30 |
| Construction and paving | 15,129,000 | 18,706,500 | 1.24 | 14,250,000 | 16,387,500 | 1.15 |
| Metallurgical | 882,000 | 1,214,500 | 1.38 | 875,000 | 1,400,000 | 1.60 |
| Railroad ballast | 1,133,000 | 1,166,700 | 1.03 | 1,250,000 | 1,250,000 | 1.00 |
| Other | 2,088,000 | 3,312,500 | 1.59 | 1,900,000 | 3,420,000 | 1.80 |
| Total | 22,606,000 | \$28,835,300 | \$ 1.27 | 22,000,000 | \$27,300,000 | \$ 1.24 |

* Revised figures.

^a Preliminary figures, subject to revision.

TABLE 24.—LIMESTONE PRODUCTION IN ILLINOIS, BY COUNTIES^a
(In tons)

| County | 1950 | 1951 | 1952 |
|-----------------------|-----------|-----------|-----------|
| Adams | 284,846 | 267,107 | 264,074 |
| Bond | — | — | 11,498 |
| Brown | — | — | 63,160 |
| Calhoun | 5,000 | 9,900 | 4,685 |
| Clark | 245,825 | 155,940 | 306,839 |
| Clay | — | — | 2,067 |
| Clinton | — | — | 30,000 |
| Coles | 263,593 | 217,542 | 269,505 |
| Effingham | 17,330 | 29,863 | 30,400 |
| Fayette | 26,000 | — | — |
| Greene | 81,780 | 77,145 | 107,697 |
| Hancock | 169,100 | 169,470 | 290,497 |
| Hardin | 213,736 | 299,377 | 303,572 |
| Henderson | 72,189 | 70,730 | 49,212 |
| Jackson | 57,551 | 87,582 | 126,083 |
| Jersey | 75,000 | 72,922 | 60,732 |
| Johnson | 183,518 | 315,112 | 345,070 |
| Livingston | 897,398 | 640,733 | 631,360 |
| Logan | 107,600 | 122,500 | 105,000 |
| McDonough | 248,861 | 147,416 | 175,979 |
| Madison | 224,855 | 239,691 | 351,589 |
| Menard | 105,597 | 115,190 | 132,345 |
| Mercer | 59,056 | 48,236 | 40,000 |
| Monroe | 457,832 | 530,011 | 461,942 |
| Peoria | 629,384 | 551,126 | 726,830 |
| Pike | 69,081 | 93,395 | 84,333 |
| Pulaski | 164,258 | 281,002 | 211,004 |
| Randolph | 864,481 | 871,134 | 1,009,226 |
| Rock Island | 361,725 | 328,123 | 388,711 |
| St. Clair | 1,326,430 | 1,591,941 | 2,238,932 |
| Schuyler | — | — | 8,000 |
| Scott | 74,000 | 85,089 | 96,496 |
| Union | 251,779 | 277,552 | 307,024 |
| Vermilion | 455,956 | 437,917 | 610,087 |
| Warren | 77,863 | 20,961 | 73,184 |
| Washington | 11,500 | 15,000 | 12,000 |
| Total | 8,083,124 | 8,169,707 | 9,929,133 |

^a Crushed limestone.

TABLE 25.—DOLOMITE PRODUCTION IN ILLINOIS, BY COUNTIES^a
(In tons)

| County | 1950 | 1951 | 1952 |
|-----------------------|-----------|------------|------------|
| Boone. | 52,622 | 25,432 | 31,171 |
| Cook | 5,407,730 | 6,729,736 | 7,618,797 |
| DeKalb | 30,304 | — | 40,000 |
| DuPage | 601,751 | 434,142 | 500,569 |
| Jersey. | 50,000 | — | 12,126 |
| Jo Daviess | 27,373 | 18,974 | 10,539 |
| Kane | 81,191 | 94,861 | 124,552 |
| Kankakee | 1,325,849 | 1,392,969 | 1,646,225 |
| Kendall | 68,220 | 54,700 | 70,900 |
| LaSalle | 164,423 | 140,518 | 235,152 |
| Lee | 181,730 | 116,577 | 150,280 |
| McHenry. | 43,767 | 27,884 | 35,833 |
| Ogle | 164,624 | 79,144 | 131,262 |
| Rock Island | 107,735 | 60,783 | 69,974 |
| Stephenson | 43,476 | 63,750 | 25,498 |
| Whiteside | 184,903 | 229,139 | 253,305 |
| Will | 1,337,203 | 1,003,681 | 1,267,683 |
| Winnebago | 54,878 | 50,908 | 36,459 |
| Total | 9,927,779 | 10,523,198 | 12,260,325 |

^a Crushed dolomite.

TABLE 26.—CLAY AND CLAY PRODUCTS

| Product | 1952* | | | 1953 ^a | | |
|--|---------|-----------------|---------|-------------------|-----------------|---------|
| | Tons | Value at plants | | Tons | Value at plants | |
| | | Total | Av. | | Total | Av. |
| Clay | 227,685 | \$ 1,159,700 | \$ 5.10 | 234,146 | \$ 1,284,100 | \$ 5.48 |
| Clay and silica refractories | 250,920 | 10,902,195 | 43.45 | 259,613 | 11,960,100 | 46.07 |
| Common brick | | 7,608,065 | | | 6,759,425 | |
| Face brick | | 5,294,170 | | | 6,922,435 | |
| Other structural clay products | | 6,108,575 | | | 4,670,420 | |
| Pottery and whiteware | | 13,438,385 | | | 15,848,020 | |
| Total | | \$44,511,090 | | | \$47,444,500 | |

* Revised figures.

^a Preliminary figures, subject to revision.

TABLE 27.—SAND^a AND GRAVEL

| Use | 1952* | | | 1953 ^b | | |
|--------------------------------|----------------|--------------|--------|-------------------|--------------|--------|
| | Amount tons | Value | | Amount tons | Value | |
| | | Total | Av. | | Total | Av. |
| Building sand | 4,170,120 | \$ 3,049,042 | \$0.73 | 4,488,000 | \$ 3,276,240 | \$0.73 |
| Paving and road sand | 2,040,737 | 1,449,071 | 0.71 | 1,558,400 | 1,246,720 | 0.80 |
| Other sand | 611,803 | 426,518 | 0.70 | 836,450 | 585,515 | 0.70 |
| Total sand | 6,822,660 | 4,924,631 | 0.72 | 6,882,850 | 5,108,475 | 0.74 |
| Building gravel | 3,521,696 | 2,874,252 | 0.82 | 3,884,975 | 3,185,680 | 0.82 |
| Paving and road gravel | 3,592,794 | 2,468,843 | 0.70 | 2,926,700 | 2,165,760 | 0.74 |
| Railroad ballast | 1,054,983 | 588,382 | 0.56 | 855,100 | 478,860 | 0.56 |
| Other gravel | 589,162 | 322,369 | 0.55 | 441,975 | 335,900 | 0.76 |
| Total gravel. | 8,758,635 | 6,253,846 | 0.71 | 8,108,750 | 6,166,200 | 0.76 |
| Total sand and gravel | 15,581,295 | \$11,178,477 | \$0.72 | 14,991,600 | \$11,274,675 | \$0.75 |

* Revised figures.
^a Exclusive of silica sand and natural bonded molding sand.
^b Preliminary figures, subject to revision.

TABLE 28.—SPECIAL SANDS

| Uses | 1952* | | | 1953 ^a | | |
|-------------------------------|----------------|-------------|--------|-------------------|-------------|--------|
| | Amount tons | Value | | Amount tons | Value | |
| | | Total | Av. | | Total | Av. |
| Silica sand | | | | | | |
| Molding sand | 997,075 | \$2,087,752 | \$2.10 | 1,080,000 | \$2,268,000 | \$2.10 |
| Other ^b | 1,370,084 | 3,350,162 | 2.45 | 1,342,000 | 3,502,800 | 2.61 |
| Total. | 2,367,159 | 5,437,914 | 2.30 | 2,422,000 | 5,770,800 | 2.38 |
| Natural bonded molding sand . | 230,529 | 474,555 | 2.06 | 55,776 | 115,914 | 2.08 |
| Total special sands. | 2,597,688 | \$5,912,469 | — | 2,477,776 | \$5,886,714 | — |

* Revised figures.
^a Preliminary figures, subject to revision.
^b Glass, grinding and polishing, blast, fire and furnace, engine, filter.

TABLE 29.—GROUND SILICA PRODUCED IN ILLINOIS

| Use | 1952 | | | 1953 ^a | | |
|-------------------------------|---------|-----------------|--------|-------------------|-----------------|---------|
| | Tons | Value at plants | | Tons | Value at plants | |
| | | Total | Av. | | Total | Av. |
| Abrasive | 92,865 | \$ 734,110 | \$7.91 | 110,770 | \$ 806,400 | \$ 7.28 |
| Ceramic | 40,355 | 352,775 | 8.74 | 37,500 | 350,970 | 9.36 |
| Foundry and filler | 55,660 | 506,945 | 9.11 | 42,500 | 496,270 | 11.67 |
| Other ground silica | 78,300 | 748,720 | 9.56 | 76,230 | 695,375 | 9.12 |
| Total. | 267,180 | \$2,342,550 | \$8.77 | 267,000 | \$2,349,015 | \$ 8.80 |

^a Preliminary figures, subject to revision.

FLUORSPAR INDUSTRY

Fluorspar is an attractive mineral about as hard as glass, fairly heavy, and brittle. It is transparent or translucent and commonly varies from green to white, but also occurs in yellow, blue, purple, pink, and brown hues. Crystallization, in the isometric system, usually takes the form of cubes.

Although fluorspar is found in many parts of the United States, the largest deposits discovered thus far are those of southern Illinois and northwestern Kentucky. The Illinois portion of this fluorspar district lies in Hardin County and eastern Pope County, which border on the Ohio River. The Kentucky deposits are chiefly in Crittenden, Livingston, and Caldwell counties. Other producing areas of the United States include several Western states, as indicated in table 31.

The chief commercial use for fluorspar is still found in the iron and steel industry. However, the percentage this industry is using of the total fluorspar consumed in the United States is less than it was a decade ago (table 32). Among the minerals needed in steel manufacturing, fluorspar holds a very important place because of its ability, as a flux, to form a fluid slag and also to help free sulfur and phosphorus from the iron. From 5 to 8 pounds is used per ton of steel.

Hydrofluoric acid, an important product of the chemical industry, requires the highest-grade fluorspar as the basic raw material for its manufacture. So important is this acid to modern industry that in 1953 about

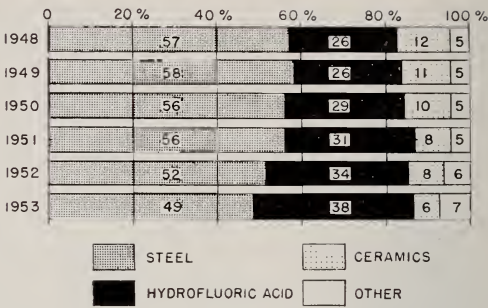


FIG. 11.—Percentage consumption of fluorspar by industries, 1948–1953.

38 percent of all fluorspar consumed in the United States was used for its manufacture. The figures in table 32 indicate the substantial growth of the hydrofluoric acid industry as a consumer of fluorspar (fig. 11).

Fluorspar is also necessary in the glass and ceramics industries, where it is used in the manufacture of colored glass, and in the manufacture of enamels used for coating steel and cast iron for such products as plumbing fixtures, table tops, signs, and cooking wares.

PRODUCTION

Consumption of fluorspar reached the unprecedented total of 520,000 tons in 1952, but shipments from domestic mines were less than in 1951. The deficit was made up by imports, which established a new record and for the first time exceeded domestic output of finished fluorspar. Although domestic consumption of fluorspar reached an all-time high in 1953, production from domestic mines declined and for the second consecutive year was less than the quantity imported (table 30).

TABLE 30.—FLUORSPAR DATA FOR THE UNITED STATES^a
(In tons)

| Year | Production | Shipments from mines | Imports | Consumption | Total industry stocks |
|-------------|------------|----------------------|---------|-------------|-----------------------|
| 1945–49 av. | 303,720 | 299,968 | 83,168 | 357,382 | 147,951 |
| 1950. | 283,500 | 301,510 | 164,634 | 426,121 | 183,723 |
| 1951. | 341,300 | 347,024 | 181,275 | 497,012 | 182,409 |
| 1952* | 345,400 | 331,273 | 352,503 | 520,197 | 279,657 |
| 1953. | 328,891 | 317,930 | 367,096 | 584,762 | 256,836 |

* Revised figures.
^a Source: U. S. Bureau of Mines.

TABLE 31.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES^a

| State | 1951* | | | 1952 | | | |
|----------------------|---------|--------------|---------|---------|--------------|---------|-----------------------|
| | Tons | Value | | Tons | Value | | Percent of total tons |
| | | Total | Av. | | Total | Av. | |
| Colorado | 20,661 | \$ 820,322 | \$39.70 | 29,185 | \$ 1,505,968 | \$51.60 | 8.8 |
| Illinois | 204,328 | 9,294,703 | 45.59 | 188,293 | 9,481,223 | 50.35 | 56.8 |
| Kentucky | 68,635 | 2,334,485 | 34.01 | 48,308 | 1,863,262 | 38.57 | 14.6 |
| New Mexico | 24,402 | 1,163,098 | 47.66 | 16,443 | 823,320 | 50.07 | 5.0 |
| Utah | 17,827 | 398,480 | 22.35 | 17,304 | 438,699 | 25.35 | 5.2 |
| Other States | | | | | | | |
| Montana | — | — | — | 16,160 | | | 4.9 |
| Nevada | 9,408 | 358,433 | 32.09 | 14,798 | 1,241,162 | 39.10 | 4.5 |
| Idaho | | | | 434 | | | |
| Arizona | 1,623 | | | 348 | | | 0.2 |
| Tennessee | 140 | | | | | | |
| Total | 347,024 | \$14,369,521 | \$41.41 | 331,273 | \$15,353,634 | \$46.35 | 100.0 |

* Revised figures.

^a Source: U. S. Bureau of Mines.TABLE 32.—CONSUMPTION OF FLUORSPAR (DOMESTIC AND FOREIGN) IN THE UNITED STATES, BY INDUSTRY^a
(In tons)

| Year | Steel | Hydro-fluoric acid | Glass | Enamel | All other | Total |
|-----------------------|---------|--------------------|--------|--------|-----------|---------|
| 1945-49 av. | 200,447 | 98,002 | 36,380 | 6,751 | 15,802 | 357,382 |
| 1950 | 240,802 | 124,440 | 33,440 | 7,723 | 19,716 | 426,121 |
| 1951 | 276,654 | 151,698 | 35,505 | 6,736 | 26,419 | 497,012 |
| 1952* | 272,476 | 178,267 | 33,837 | 5,205 | 30,412 | 520,197 |
| 1953 | 286,099 | 223,360 | 33,140 | 6,141 | 36,022 | 584,762 |
| Percent of 1953 total | 48.9 | 38.2 | 5.7 | 1.1 | 6.1 | 100.0 |

* Revised figures.

^a Source: U. S. Bureau of Mines.TABLE 33.—UNITED STATES IMPORTS OF FLUORSPAR^a

| Source | 1952* | | 1953 | |
|-------------------------|---------|--------------|----------------------|-----------------------|
| | Tons | Value | Tons | Percent of total tons |
| Africa (total). | 7,065 | \$ 125,018 | 4,980 | 1.4 |
| Canada | 18,675 | 643,999 | 24,804 | 6.8 |
| France | 1,120 | 53,764 | 1,163 | 0.3 |
| Germany | 60,451 | 2,272,268 | 35,866 | 9.8 |
| Italy | 30,403 | 1,046,977 | 55,038 | 15.0 |
| Mexico | 175,102 | 4,426,033 | 192,837 | 52.5 |
| Spain | 59,687 | 1,959,525 | 52,286 | 14.2 |
| Total. | 352,503 | \$10,527,584 | 367,096 ^b | 100.0 |

* Revised figures.

^a Source: U. S. Bureau of Mines.^b Includes 122 tons from United Kingdom.

ILLINOIS PRODUCTION

Illinois during 1952 maintained its rank as the foremost producer of fluorspar in the United States by supplying almost 57 percent of the nation's total domestic shipments (table 31). The next largest producer of fluorspar among the states is Kentucky, with an output of about 15 percent of the nation's total.

The average price of Illinois fluorspar shipped from mines has shown a steady increase since the year 1948 when the price was \$36.64 per ton. The average price for

Illinois fluorspar in 1952 was \$50.35 per ton as compared to the national average of \$46.35 per ton.

IMPORTS

During 1953 United States imports of fluorspar increased to a new record of 367,000 tons, exceeding domestic output by 11 percent. Table 33 shows that more than half of the imported material came from Mexico. Other countries furnishing imports of sizable quantities included Italy, Spain, Germany, and Canada.

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